

Electro-Mech Industries
Product Catalog



Electro-Mech. Industries

2420 Hamilton Road
Arlington Heights, Illinois 60005

Thank you for your interest in our company, Electro-Mech Industries (EMI). We encourage the use of our catalog, as a useful guide to facilitate your purchasing needs.

If you require additional information or have any questions, please do not hesitate to contact us.

Technical Assistance:

Chris Ganas

Sales & Pricing Information:

Pamela Colditz



Electro-Mech. Industries

2420 Hamilton Rd. Arlington Heights, IL 60005
PH. (847) 593-4900 FAX (847-593-1394)

NEW CUSTOMER CREDIT APPLICATION

For the purpose of establishing credit with creditor I/we, the undersigned, warrant the financial information below to be true correct and complete to the best of my knowledge and hereby authorize any credit investigation needed for verification.

NAME OF BUSINESS (dba)		SOLE <input type="checkbox"/>		PARTNERSHIP <input type="checkbox"/>		CORPORATION <input type="checkbox"/>	
CORPORATION OR OTHER NAME				DATE BUSINESS STARTED			
STREET ADDRESS		CITY, STATE			ZIP CODE		
BILLING ADDRESS		CITY, STATE			ZIP CODE		
BUSINESS PHONE NUMBER		FAX NUMBER		ACCOUNTS PAYABLE PHONE NUMBER		FAX NUMBER	
ACCOUNTS PAYABLE CONTACT				PURCHASING CONTACT			
BANK NAME AND BRANCH				BANK PHONE NUMBER		BANK ACCOUNT#	

Name and address of officers, partners owners or other responsible parties.

	FULL NAME	TITLE	RESIDENCE ADDRESS	PHONE NUMBER
1				
2				
3				

List four principal suppliers with whom you have maintained credit for a minimum of one year.

	COMPANY NAME & LOCATION	ACCOUNT NUMBER	PHONE NUMBER	FAX NUMBER
1				
2				
3				
4				

Read before signing. I/we hereby agree to the terms, net 30 days unless otherwise stated. In the event of collection, customer pays all costs and attorney fees. Any balance over 30 days is subject to a service charge of 1.5% per month (18% per annum).

Signature

Title

Date

FOR CORPORATION ONLY - General Continuing Guarantee

In Consideration of the extension of credit for goods extended by the seller mentioned above I/we:

NAME	ADDRESS
NAME	ADDRESS

We the undersigned, do hereby jointly severally and personally guarantee the prompt payment of any and all indebtedness of the applicant to the seller according to the terms there of.

In case suit or action is instituted to collect any portion of an account owed by any parties to the agreement, I/we promise to pay such additional sums as the court may adjudge reasonable, including attorney's fee.

Signature


Date

Signature

Date

Submersible Pump Motors

PUMPS - MOTORS CROSS REFERENCE

Pump Manufacturers			Features	HP	EMI Motor Part Number		
Allweiler "SUB"	IMO	SETTIMA <small>dist. by</small> 					
SUB20 Series	100Y thru	GR25SMU Series	L19 Flange 19mm Shaft	2.5	Single Phase 230V 60Hz SUBJ0322 SUBJ0522 SUBJ1022		
SUB40 Series	125AC	GR32SMU Series		5			
SUB80 Series	GS535496, 7, 8	GR40SMU Series		10			
					Three Phase 200-230/460V 60Hz		
				2.5	SUBJ03TR SUBJ05TR SUBJ10TR		
				5			
				10			
					Three Phase 60Hz		
					200V	230/460V	575V
SUB140 Series	162P thru 276G	GR45SMU Series	"Z" Flange 32mm Shaft	15	SUBJ195	SUBJ196	SUBJ197
SUB210 Series		GR55SMU Series		20	SUBJ198	SUBJ199	SUBJ200
SUB280 Series		GR60SMU Series		25	SUBJ201	SUBJ202	SUBJ203
		GR70SMU Series		30	SUBJ204	SUBJ205	SUBJ206
		GR80SMU Series		40	SUBJ207	SUBJ208	SUBJ209
				50	SUBJ210	SUBJ211	SUBJ212
SUB440 Series	GS032839 GS032840		L32 Flange 32mm	15	SUBJ195A	SUBJ196A	SUBJ197A
				20	SUBJ198A	SUBJ199A	SUBJ200A
				25	SUBJ201A	SUBJ202A	SUBJ203A
				30	SUBJ204A	SUBJ205A	SUBJ206A
				40	SUBJ207A	SUBJ208A	SUBJ209A
				50	SUBJ210A	SUBJ211A	SUBJ212A

If a pump model is not listed, please call EMI for further assistance.

Data given is for information, subject to change without notice.



Electro-Mech. Industries
2420 Hamilton Rd., Arlington Heights, IL 60005
Phone (847) 593-4900 Fax (847) 593-1394

SPEC.: SB0104
R3DATE: SEPT

MANUFACTURED BY:



Submersible Pump Motors

THREE PHASE ELECTRICAL CHARACTERISTICS

- 80 Starts per Hour (Maximum Oil Temperature 50°C)
- 1.0 Service Factor - Insulation Class "F"
- Windings Protected by Normally Closed Contact (75°C - 230VAC 3 Amps)
- Wye-Delta Start Connected; 15 to 50HP 6 or 12 Lead
- 15 to 50HP 87" Lead Length with 2 Butt Splices at 12 and 48" from motor frame
- 3 to 10HP 48" Lead Length with 1 Butt Splice at 12" from motor frame.
- CSA Approved

HP	VOLTS 60Hz	NEMA CODE	FRAME	FULL LOAD RPM (1)	FULL LOAD AMPS (1)	STARTING (2) AMPS (DELTA)	FULL LOAD POWER FACTOR (1)
3 (3)	200 230/460	H	90	1700	9.3 9.6/4.8	58 50/25	0.75
5 (3)	200 230/460	G	112	1720	15.2 14/6.9	83 72/36	0.81
10 (3)	200 230/460	L	125	3435	30.4 35/17.5	267 232/116	0.70
15	200 230/460 575	F	160	3455	52 45/22.5 18	261 228/114 90	0.87
20	200 230/460 575	F	160	3465	72 62/31 25	327 285/143 114	0.83
25	200 230/460 575	G	160	3455	82 70/35 28	411 357/179 144	0.89
30	200 230/460 575	E	160	3445	100 86/43 35	417 363/182 144	0.90
40	200 230/460 575	G	160	3430	121 106/53 42	624 543/272 216	0.91
50	200 230/460 575	G	160	3460	148 130/65 52	828 723/362 288	0.91

(1) Values measured with motor running in oil.

(2) For starting amps in WYE connection, divide these values by 3.

(3) Across the line start only (9 lead). For dimensions see "Single Phase Submersibles"

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SPEC.: SB0103 R4
DATE: AUGUST 02

MANUFACTURED BY:

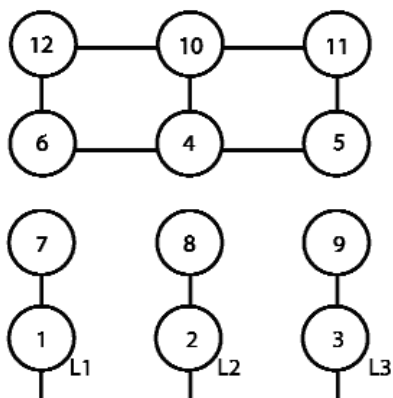


Submersible Pump Motors

CONNECTION DIAGRAM 12-LEAD

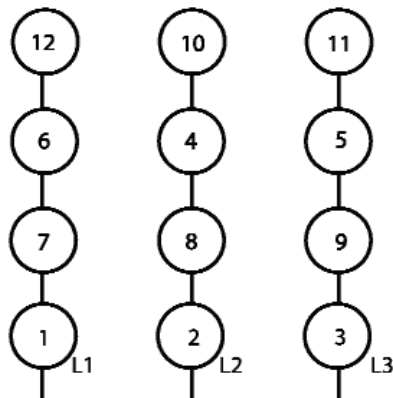
A - Low Voltage

WYE START, LOW VOLTAGE



LINE L1	1 - 7
LINE L2	2 - 8
LINE L3	3 - 9
CONNECT TOGETHER	6 - 4 - 5 - 12 - 10 - 11

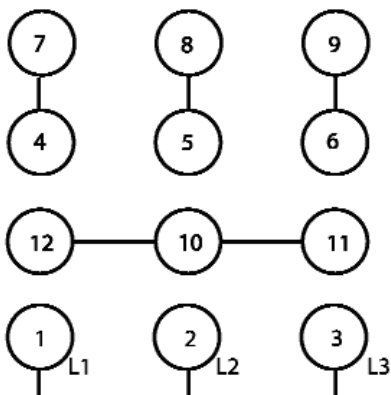
DELTA RUN, LOW VOLTAGE



LINE L1	1 - 6 - 7 - 12
LINE L2	2 - 4 - 8 - 10
LINE L3	3 - 5 - 9 - 11
CONNECT TOGETHER	-

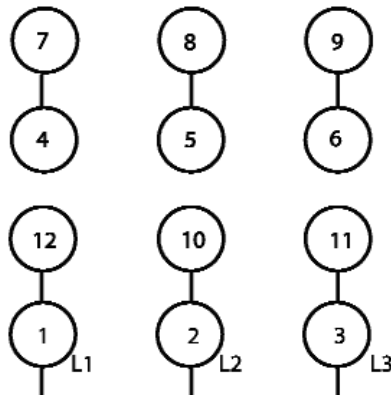
B - High Voltage

WYE START, HIGH VOLTAGE



LINE L1	1
LINE L2	2
LINE L3	3
CONNECT TOGETHER	10-11-12
	4 - 7
	5 - 8
	6 - 9

DELTA RUN, HIGH VOLTAGE



LINE L1	1 - 12
LINE L2	2 - 10
LINE L3	3 - 11
CONNECT TOGETHER	4 - 7
	5 - 8
	6 - 9



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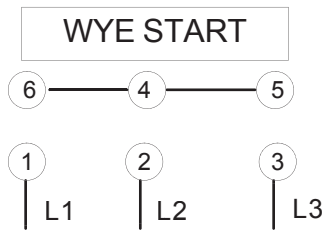
SPEC.: SB0105 R1
DATE: JULY 98

MANUFACTURED BY:

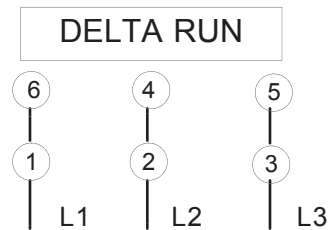


Submersible Pump Motors

CONNECTION DIAGRAM 6-LEAD



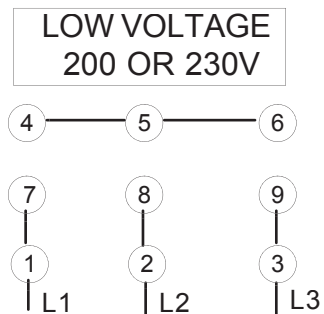
LINE L1	1
LINE L2	2
LINE L3	3
CONNECT TOGETHER	6 - 5 - 4



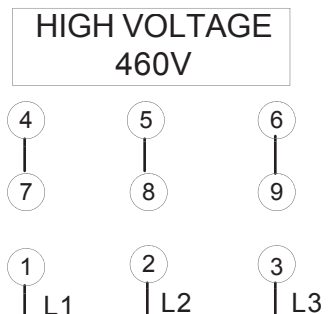
LINE L1	1 - 6
LINE L2	2 - 4
LINE L3	3 - 5
CONNECT TOGETHER	

CONNECTION DIAGRAM 9-LEAD

3-10 HP 3PH MOTORS ONLY



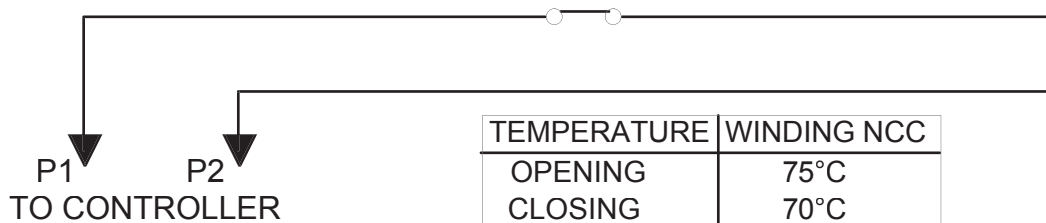
LINE L1	7 - 1
LINE L2	8 - 2
LINE L3	9 - 3
CONNECT TOGETHER	4 - 5 - 6



LINE L1	1
LINE L2	2
LINE L3	3
CONNECT TOGETHER	4 - 7
CONNECT TOGETHER	5 - 8
CONNECT TOGETHER	6 - 9

CONNECTION DIAGRAM - THERMAL PROTECTION

NORMALLY CLOSED CONTACT



P1 - P2 Contact rating: 2.5 Amps at 250V (AC only)



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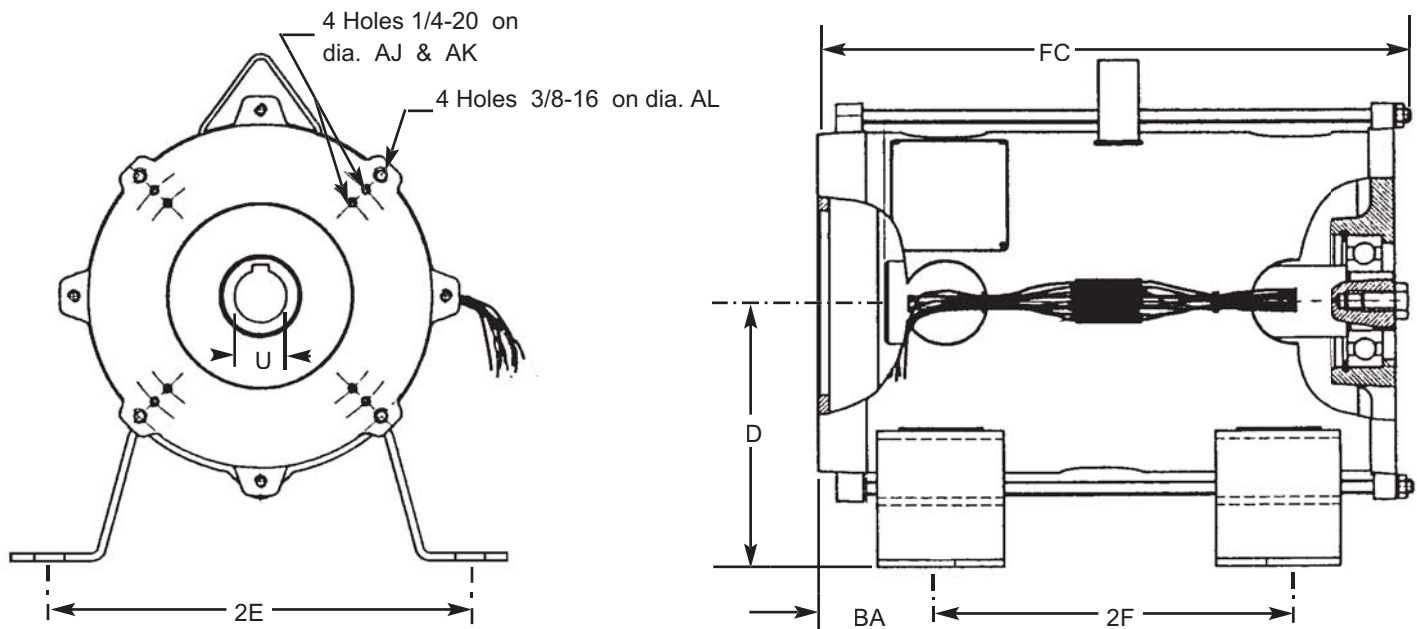
SPEC.: SB0105A R2
DATE: AUGUST 02

MANUFACTURED BY:



Submersible Pump Motors

3 PHASE DIMENSIONAL DRAWING Z-FLANGE



H.P.	2E	2F	D	FC	AJ	AK	AL	BA	U
15-30	10	8.15	6.3	14.13	6.25	7.125	8.125	2.835	32mm
40-50	10	8.15	6.3	17.44	6.25	7.125	8.125	2.835	32mm



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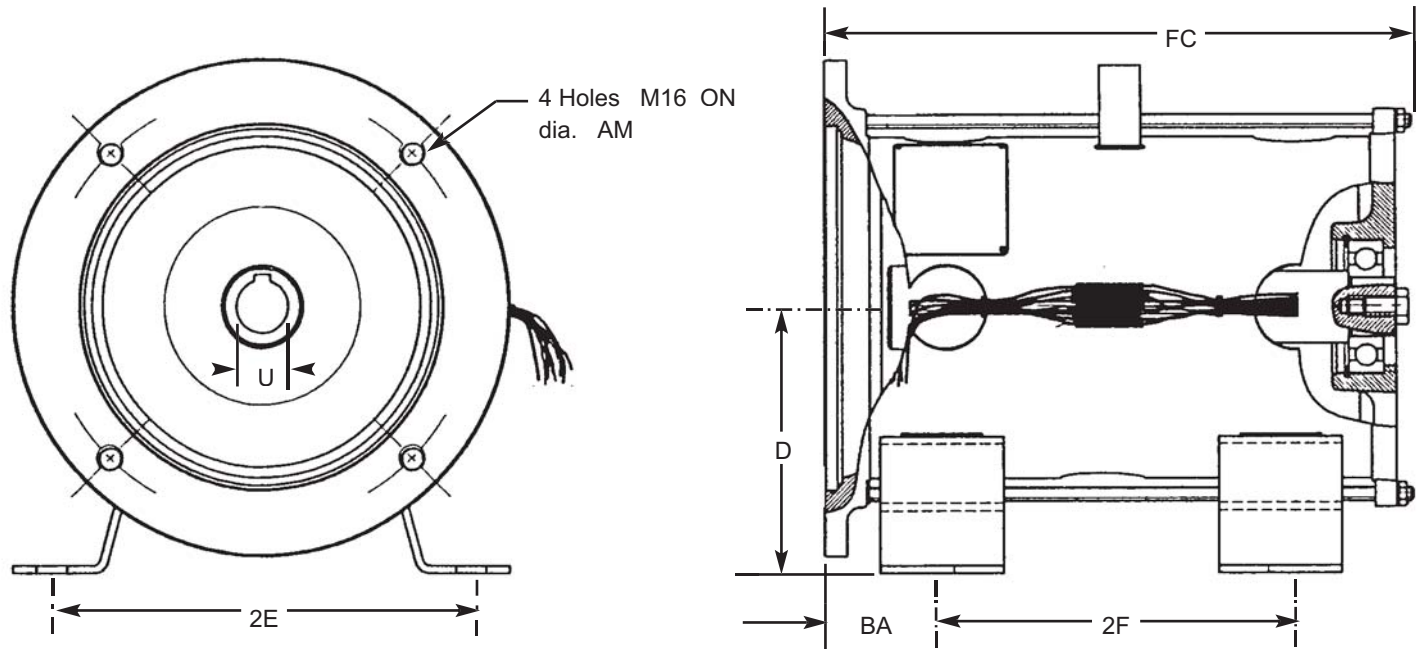
SPEC.: 701.9.049 R1
DATE: JULY 98

MANUFACTURED BY:



Submersible Pump Motors

3 PHASE DIMENSIONAL DRAWING L32 FLANGE



H.P.	2E	2F	D	FC	AM	BA	U
15-30	10	8.15	6.3	14.13	10.236	2.795	32mm
40-50	10	8.15	6.3	17.44	10.236	2.795	32mm



Electro-Mech. Industries

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SPEC.: 701.9.052 R1
DATE: JULY 98

MANUFACTURED BY:

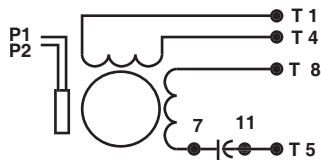


Single Phase Submersible Pump Motors

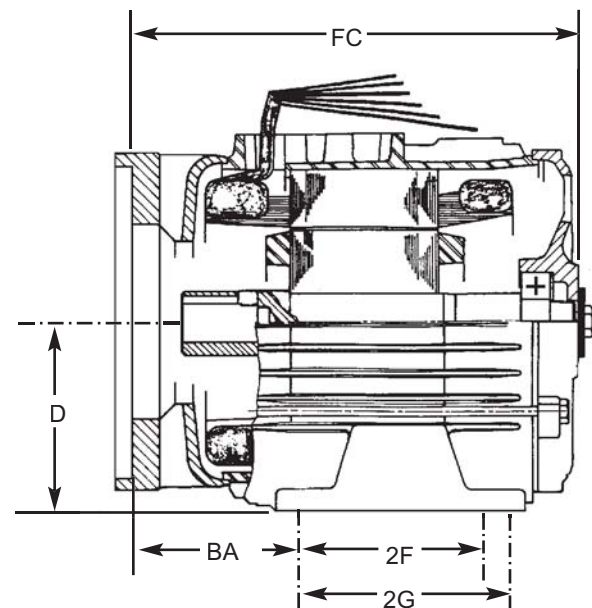
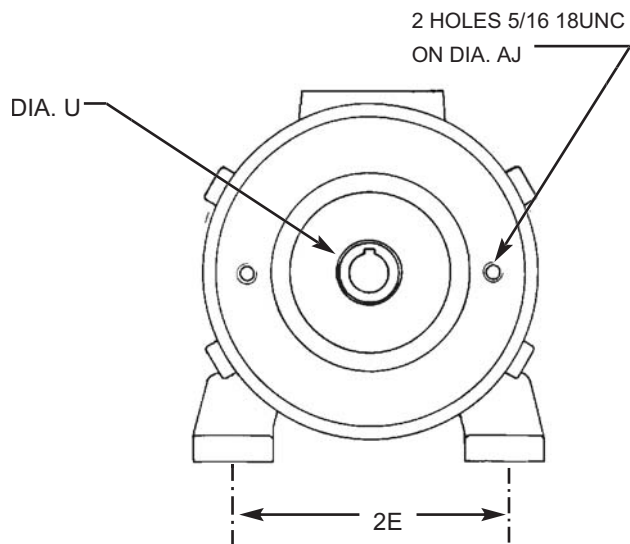
- Single Phase, 230VAC, 60Hz, 80 Starts per Hour
- CSA Approved
- Windings Protected by Normally Closed Contact (100° C - 230VAC 3 Amps, P1 & P2)
- Lead length is 48" with a butt splice at 12".

H.P.	F.L. RPM	F.L. AMPS	L.R. AMPS	CAPACITANCE
2.5	1710	12.9	55.5	60
5	1650	21	72	80*
10	3430	47.5	167	200*

*NOTE: CAPACITORS CONNECTED IN PARALLEL



ROTATION	L1	L2
C.C.W.	T1-T8	T4-T5
C.W.	T1-T5	T4-T8



HP	2E	2F	2G	D	FC	BA	AJ	U
2.5	5.5	4.0	5.0	3.53	8.90	3.07	5.31	19mm
5.0	7.48	4.5	5.5	4.41	11.01	3.62	5.31	19mm
10.0	7.5	4.5	5.5	4.5	11.53	1.96	5.31	19mm



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SPEC.: E4560 R3
DATE: SEPT. 98

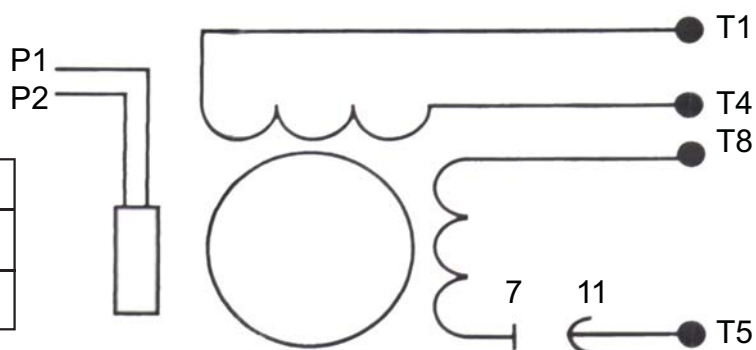
MANUFACTURED BY:



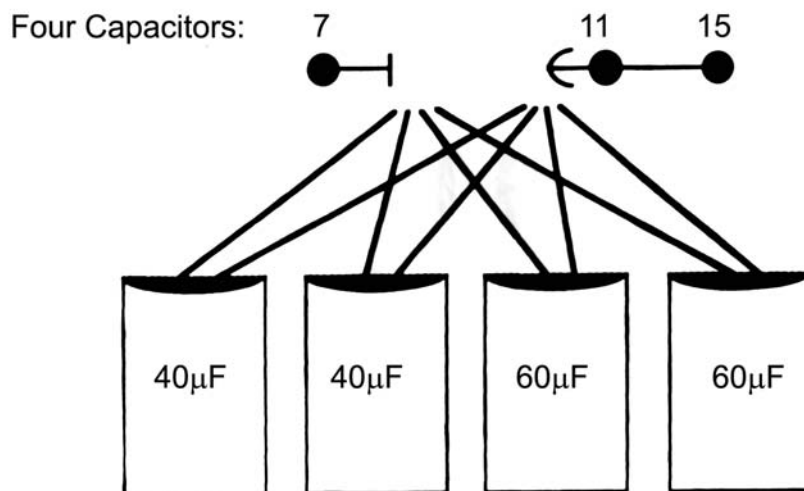
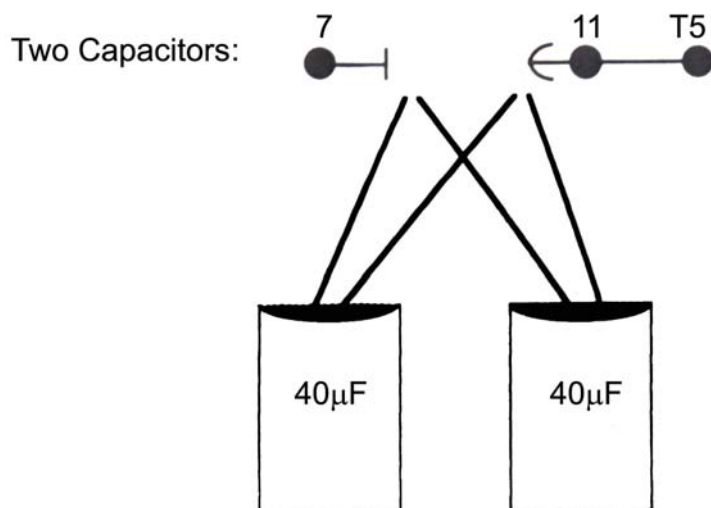
Single Phase Submersible Pump Motors

Motor Connection

Rotation	L1	L2
C.C.W.	T1 - T8	T4 - T5
C.W.	T1 - T5	T4 - T8



Multiple Capacitor Parallel Connection



Electro-Mech Industries

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SPEC.: E4560 R3-01
DATE: SEPT. 98

MANUFACTURED BY:



Submersible Pump Motors

Motor Identification

To insure correct field replacement, obtain as much of the following information as possible.

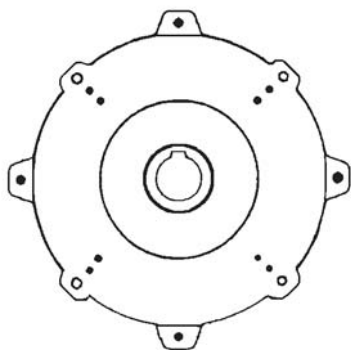
MOTOR DATA

HORSEPOWER: _____ (HP)

VOLTAGE: _____ (V)

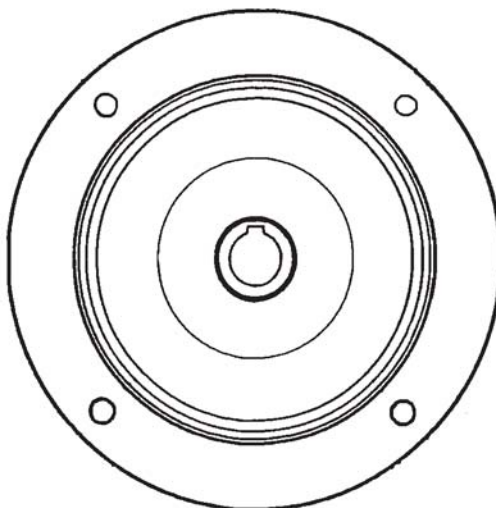
CUSTOMER PART NUMBER _____

MOTOR FLANGE



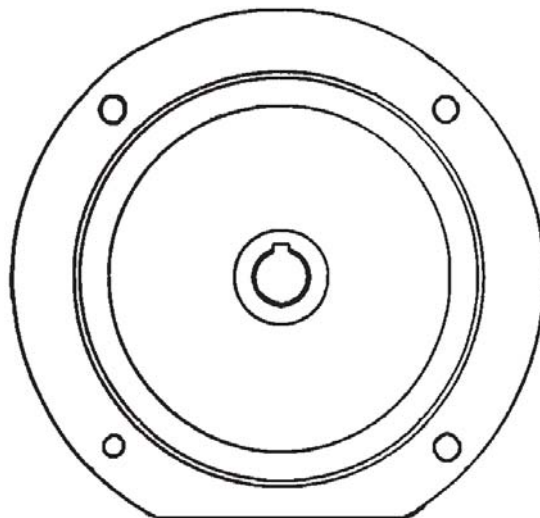
"Z" Flange

Bolt Circle Dimensions:
6.25": 7.125": 8.125"



"L32" Flange

Bolt Circle Dimension = 10.236"



"L38" Flange

Bolt Circle Dimension = 12.25"

MOTOR SHAFT

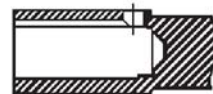
Please circle one ("U" dimension)

19mm (0.748")

24mm (0.945")

32mm (1.260")

38mm (1.496")



PUMP DATA (IF AVAILABLE)

Pump Manufacturer: _____

Model Number: _____



Electro-Mech. Industries

2420 Hamilton Rd., Arlington Heights, IL 60005
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SPEC.: SB108 R1
DATE: JULY 98

MANUFACTURED BY:



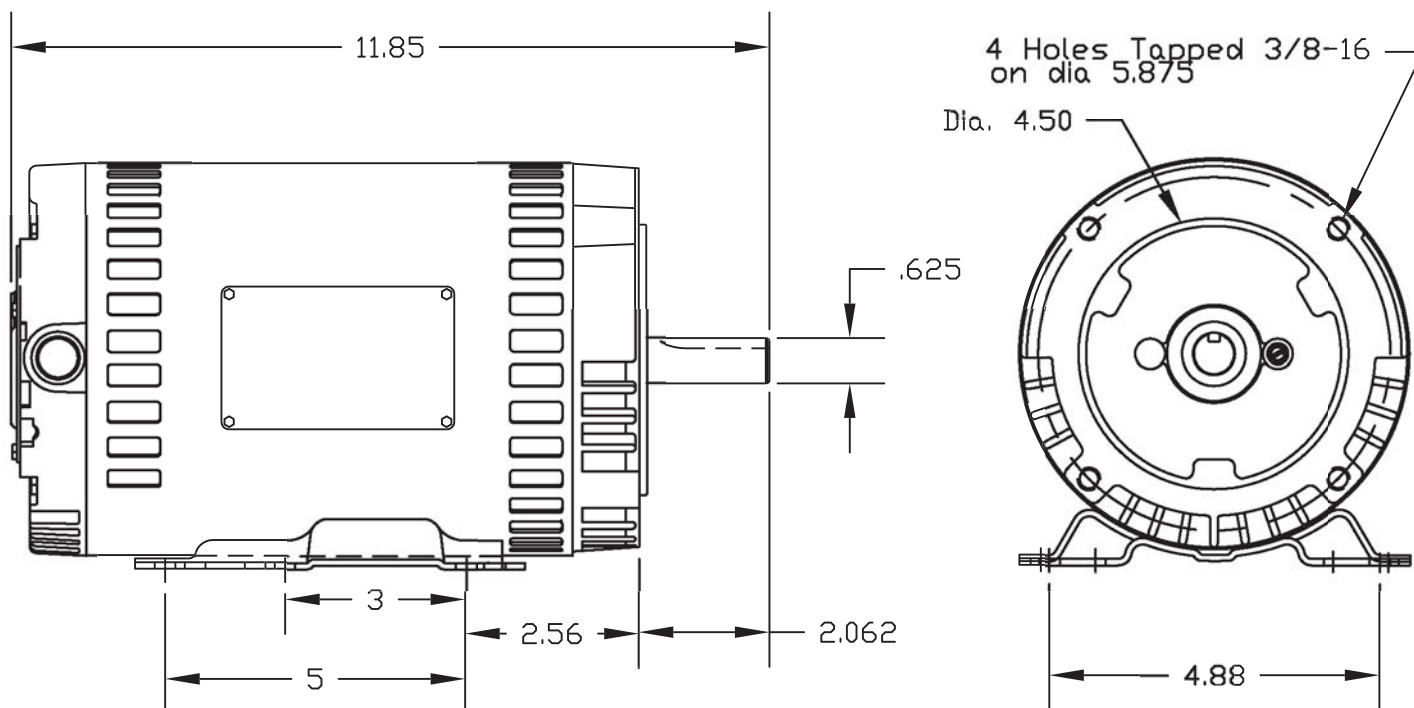
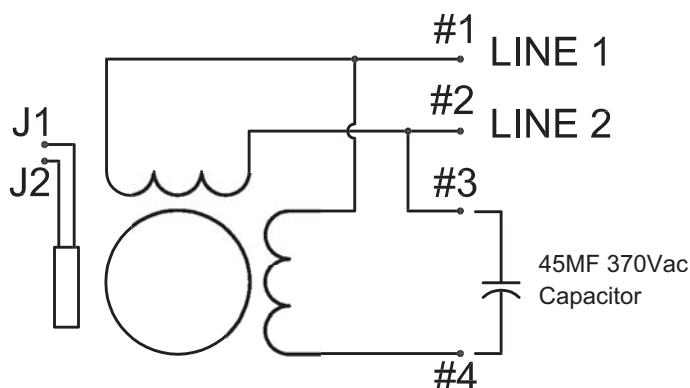
New Single Phase Submersible Pump Motor

- Motor winding are protected by a Normally Closed temperature sensor which opens at 120deg. C. The N.C.C. is rated for 230Vac, 2A and labeled J1 - J2.
- Motor rotation is C.W. as viewed from the non-drive end and is not reversible.
- Motors are UL listed
- Lead length is 49 inches
- Standard NEMA 56C Frame

Performance Data:

H.P.	VOLTAGE	F.L. RPM	F.L. AMPS
3	208	1741	14.9
3	230	1756	17
4	208	1719	19.5
4	230	1733	20.2

Connection Diagram:



Electro-Mech. Industries

2420 Hamilton Rd., Arlington Heights, IL 60005
Phone (847) 593-4900 Fax (847) 593-1394

SPEC.: J0423
DATE: January 2007

MANUFACTURED BY:



Dry Hydraulic Pump Motors

Electrical Characteristics 80 Starts/Hour

- Class F Insulation
- Class B Temp Rise (40 deg. C Amb.)
- 80 Starts/Hour
- 1800 SRPM
- Ball Bearing Design
- Enclosure: ODP
- Foot Mounted
- Motors are suitable for Wye-Delta starting if reduced starting current is desired
- Conforms to UL and CSA standards

HP	VOLTS	FRAME	RPM	FULL LOAD AMPS	LOCKED ROTOR AMPS *	POWER FACTOR	EFFICIENCY	NEMA CODE
20	200 230/460 575	254T	1760	60 52/26 21	261 224/112 87	79.0	.91	E
25	200 230/460 575	256T	1755	73 63/32 26	331 290/145 113	82.0	.90	E
30	200 230/460 575	284T	1760	83 72/36 29	419 351/175 140	86.0	.91	E
40	200 230/460 575	286T	1760	109 94/47 38	495 424/212 170	86.0	.92	E
50	200 230/460 575	324T	1765	133 116/58 46	667 562/281 232	88.0	.92	E
60	200 230/460 575	326T	1765	160 140/70 57	833 724/362 290	88.0	.92	E
75	230/460 575	364T	1765	174/87 69	800/400 311	87.0	.92	E
100	230/460 575	365T	1765	230/115 92	1004/502 421	88.0	.93	D
125	230/460 575	404T	1765	288/144 116	1330/665 579	87.0	.94	E

* FOR STARTING AMPS IN WYE CONNECTION DIVIDE THESE VALUES BY 3.

Data given for information, subject to change without notice.



Electro-Mech. Industries

2420 Hamilton Rd., Arlington Heights, IL 60005
Phone (847) 593-4900 Fax (847) 593-1394

SPEC.: 3400-B
DATE: JUNE 99

MANUFACTURED BY:



Dry Hydraulic Pump Motors

Electrical Characteristics 120 Starts/Hour

- Class F Insulation
- Class B Temp Rise (40 deg. C Amb.)
- 1800 SRPM
- Ball Bearing Design
- Enclosure: ODP
- Foot Mounted
- Motors are suitable for Wye-Delta starting if reduced starting current is desired
- Conforms to NEMA, UL and CSA Standards

HP	VOLTS	FRAME	RPM	FULL LOAD AMPS	LOCKED ROTOR AMPS*	POWER FACTOR	EFF.	NEMA CODE
20	200 230/460 575	256T	1770	58 50/25 21	331 290/145 113	82.0	.91	G
25	200 230/460 575	284T	1775	70 60/30 25	419 351/175 140	84.0	.90	G
30	200 230/460 575	286T	1775	81 71/35 29	495 424/212 170	86.0	.91	G
40	200 230/460 575	324T	1780	106 91/46 37	667 562/281 232	87.0	.92	G
50	200 230/460 575	326T	1780	131 114/57 46	833 724/362 290	88.0	.92	G
60	230/460 575	364T	1785	138/69 55	800/400 311	86.0	.93	F
75	230/460 575	365T	1785	172/86 70	1004/502 421	86.0	.94	F
100	230/460 575	404T	1785	226/113 90	1330/665 579	87.0	.94	F

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* FOR STARTING AMPS IN WYE CONNECTION DIVIDE THESE VALUES BY 3.



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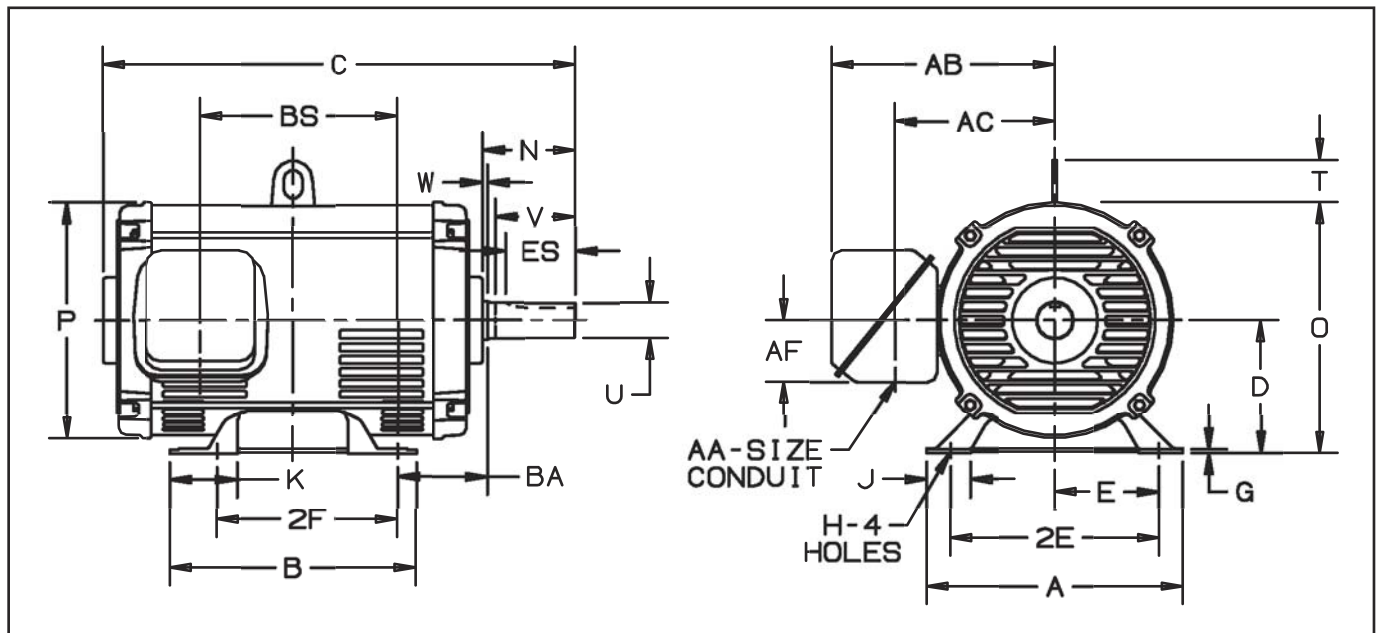
SPEC.: 3401-A
DATE: JUNE 99

MANUFACTURED BY:



Dry Hydraulic Pump Motors

Motor Dimensions 254T-326T



FRAME	MOTOR											
	A	B	C	D	E	2F	G	H	J	O	T	P
254T	11.25	11.75	23.2	6.25	5	8.25	0.19	0.53	1.38	11.75	2.06	11.1
256T						10						
284T	13.5	12.94	24.88	7	5.5	9.5	0.19	0.53	2.31	13.19	2.22	12.44
286T						11						
324T	15	14	27.5	8	6.25	10.5	0.25	0.69	2.31	15.13	2.19	14.19
326T						12						

FRAME	MOTOR						SHAFT					
	AB	AC	AF	BA	BS	AA	N	KEY	U	V	W	ES
254T	9.75	7.44	1.81	4.25	9.19	1.25	4.44	0.38	1.625	3.75	0.44	2.91
256T												
284T	11.75	8.44	3.25	4.75	10.38	2	4.88	0.5	1.875	4.38	0.25	3.63
286T												
324T	12.69	9.31	3.25	5.25	11.5	2	5.75	0.5	2.125	5	0.5	3.91
326T												

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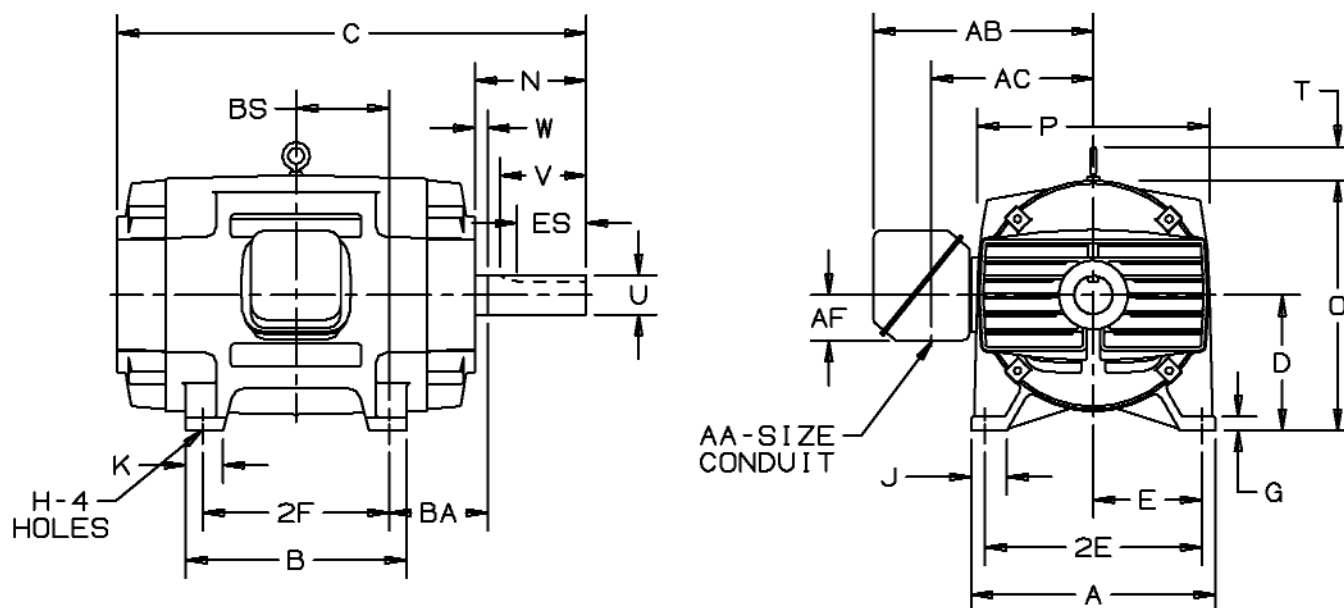
SPEC.: 3420-B
 DATE: June 99

MANUFACTURED BY:



Dry Hydraulic Pump Motors

Motor Dimensions 364T-404T



FRAME	MOTOR											
	A	B	C	D	E	2F	G	H	J	O	T	P
364T	17.63	13.75	28.69	9	7	11.25	1	0.66	3.44	17.75	2.47	17.63
365T	17.63	14.75	29.69	9	7	12.25	1	0.66	3.44	17.75	2.47	17.63
404T	18	14.75	32.56	10	8	12.25	1	0.81	2.63	18.81	2.47	17.63

FRAME	MOTOR						SHAFT					
	AB	AC	AF	BA	BS	AA	N	KEY	U	V	W	ES
364T	16.19	11.94	3.38	5.88	5.63	3	6.13	0.63	2.375	5.63	0.25	4.31
365T	16.19	11.94	3.38	5.88	6.13	3	6.13	0.63	2.375	5.63	0.25	4.31
404T	16.19	11.94	3.38	6.63	6.13	3	7.5	0.75	2.875	7	0.25	5.75

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Electro-Mech. Industries

2420 Hamilton Rd., Arlington Heights, IL 60005
Phone (847) 593-4900 Fax (847) 593-1394

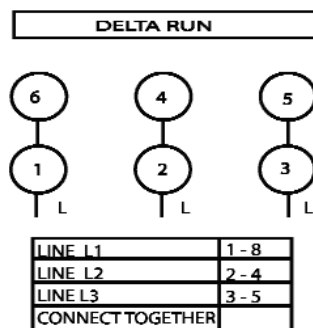
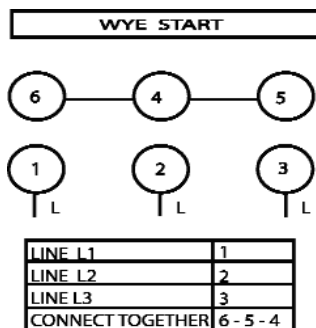
SPEC.: 3421-B
DATE: June 99

MANUFACTURED BY:



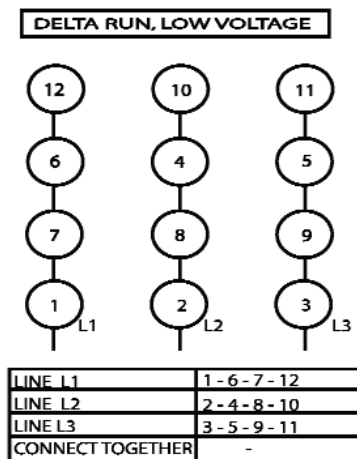
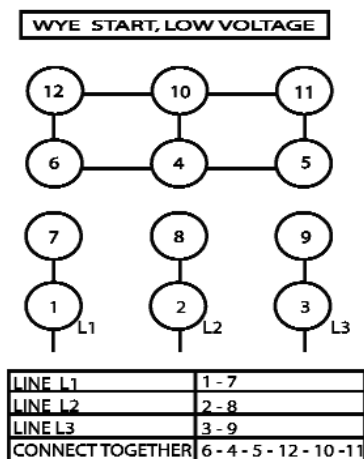
Dry Hydraulic Pump Motors

CONNECTION DIAGRAM 6-LEAD

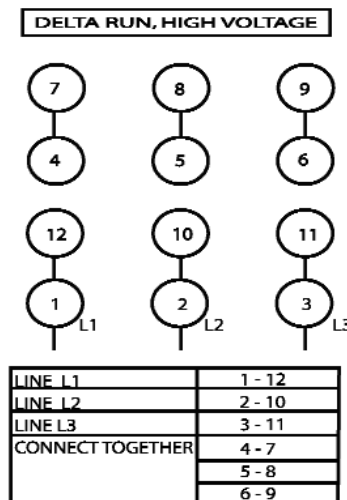
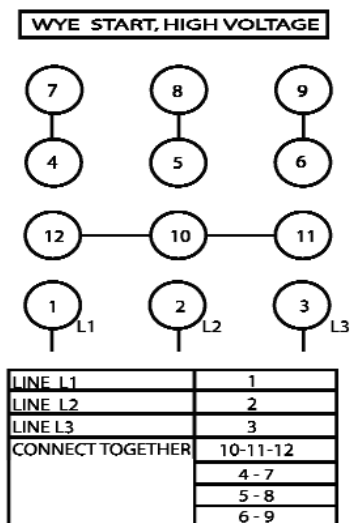


CONNECTION DIAGRAM 12-LEAD

A - LOW VOLTAGE



B - HIGH VOLTAGE



Electro-Mech. Industries

2420 Hamilton Rd., Arlington Heights, IL 60005
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SPEC.: 3410-A
DATE: MAY 99

MANUFACTURED BY:



Low Flow Elevator Screw Pumps

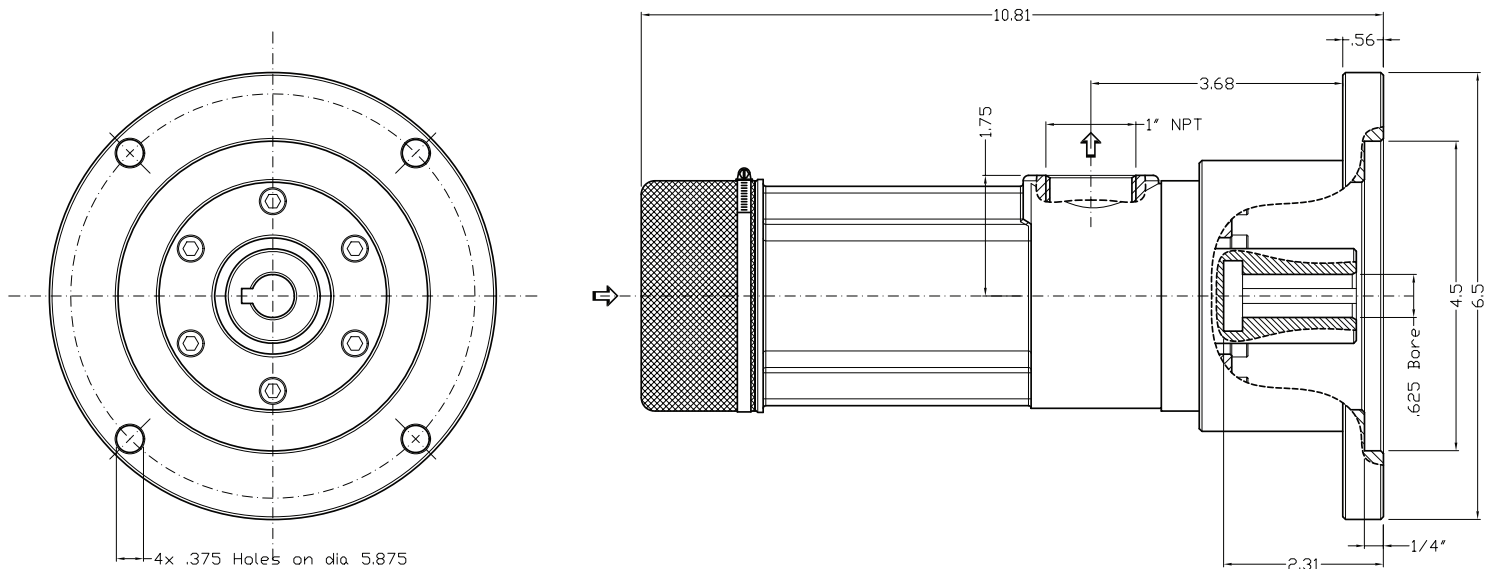
- Hollow Shaft Pumps Mount Directly to NEMA 56C Frame motors
- Six Flow Rates Available
- Pump Rotation is C.W. as Viewed from Drive End
- 300 Micron Screen
- Virtually Noise and Pulsation FREE

Settima has been manufacturing elevator screw pumps since 1978 and currently produces over 30,000 pumps per year. The pumps are a positive displacement rotary design with axial flow. A major design feature is the self aligning power rotor which virtually eliminates pump noise and pulsations.

What separates this product line from other screw pumps is the 5/8" dia hollow shaft and the 56C flange. The pump is designed to mount directly to a standard NEMA 56C frame motor. This allows the O.E.M. to use an "off the shelf" motor.

These pumps can be mounted in any position as long as the inlet remains submersed in oil. This accommodates both submersible and dry motor arrangements.

Dimensional Data:



Electro-Mech Industries

2420 Hamilton Rd., Arlington Heights, IL 60005
Phone: (847) 593-4900 Fax (847) 593-1394

SPEC.: GR2532 PG1
DATE: January 2007

MANUFACTURED BY:



SETTIMA MECCANICA

Low Flow Elevator Screw Pumps

Settima Elevator Screw Pumps

Roped Hydro (1:2) Car Speed (feet per minute) for Various Dia. Pistons
1750 RPM, 400 PSI, 150 SSU

Car Speed (Feet per Minute)										
Piston (mm)	60					70			80	90
Piston (in)	2.362	2 3/8	2 1/2	2 5/8	2 3/4	2.756	2 7/8	3.000	3.150	3.543
Model#	Car Speed (ft/min)									
GR25-25L	39.58	39.16	35.34	32.05	29.20	29.08	26.72	24.54	22.26	17.59
GR25-30L	49.26	48.73	43.98	39.89	36.34	36.19	33.25	30.54	27.71	21.89
GR32-35L	58.05	57.43	51.83	47.01	42.83	42.65	39.19	35.99	32.65	25.80
GR32-45L	71.24	70.48	63.61	57.69	52.57	52.34	48.10	44.17	40.08	31.66
GR32-55L	77.40	76.57	69.10	62.68	57.11	56.87	52.25	47.99	43.54	34.40
GR32-75L	102.91	101.80	91.88	83.34	75.93	75.61	69.47	63.80	57.89	45.74

Note: For direct drive Hydro applications, Car speed will be 1/2 of stated values.

Settima Elevator Screw Pumps

1750 RPM, 150 SSU

		Pressure at Pump Discharge (PSI)									
Model#		200	300	350	400	450	500	550	600	700	800
GR25-25L	GPM	4.70	4.60	4.50	4.50	4.40	4.40	4.30	4.30	4.20	4.20
	HP	0.8	1.1	1.3	1.4	1.5	1.7	1.8	1.9	2.2	2.5
GR25-30L	GPM	5.90	5.70	5.60	5.60	5.50	5.50	5.40	5.40	5.30	5.20
	HP	1.0	1.4	1.6	1.8	1.9	2.1	2.3	2.4	2.8	3.1
GR32-35L	GPM	6.90	6.70	6.70	6.60	6.50	6.50	6.40	6.30	6.20	6.10
	HP	1.2	1.6	1.9	2.1	2.3	2.5	2.7	2.9	3.2	3.6
GR32-45L	GPM	8.40	8.20	8.10	8.10	8.00	7.90	7.80	7.80	7.60	7.50
	HP	1.5	2.0	2.3	2.5	2.8	3.0	3.3	3.5	4.0	4.4
GR32-55L	GPM	9.20	9.00	8.90	8.80	8.70	8.60	8.50	8.50	8.30	8.20
	HP	1.6	2.2	2.5	2.8	3.0	3.3	3.6	3.9	4.3	4.9
GR32-75L	GPM	12.30	12.00	11.80	11.70	11.60	11.50	11.40	11.30	11.10	10.90
	HP	2.1	2.9	3.3	3.7	4.0	4.4	4.8	5.1	5.8	6.5



Electro-Mech. Industries
 250 Hamilton Rd., Arlington Heights, IL 60005
 Phone (847) 593-4900 Fax (847) 593-1394

SPEC.: GR2532r2PG2
 DATE: July 2016

MANUFACTURED BY:



Elevator Screw Pumps

Features & Benefits

Overview:

Settima Meccanica has been manufacturing Elevator screw pumps since 1978 and is ISO 9001/2000 certified. With over 500,000 units in operation and current production levels exceeding 30,000 unit per year, Settima Meccanica is an industry leading screw pump manufacturer.

Operation:

All models are positive displacement rotary pumps with an axial flow design. There are only three moving parts and the power rotor is the only driven component that extends outside the housing. The idler screws actually act as sealing parts and are turned hydraulically by the pumped fluid. There is only a rolling action between the drive screw and the idlers this rolling action eliminates noise and vibration.

Specifications & Features

- * Rotor Housing: Alloy Al-Si Treated - UNI 3600
- * Power Rotor: Steel - UNI 4838
- * Idler Rotors: Pearlitic iron - UNI 5007
- * Suction Filter: 0.0003 inch²
- * Operating Pressure: 1,100 PSI max
- * Viscosity: 18 to 9270 SSU
- * Temperature: 100 deg C max
- * Rotation: C.W. as viewed facing pump shaft
- * Noise: Silent

Product Offering:

- * Residential Submersible Standard :
Six models ranging from 9 to 25 GPM @ 3400rpm. Standardized shaft and mounting dimensions allow for mounting to all the most popular submersible motors.
- * Residential Submersible Hollow Shaft:
Six models ranging from 9 to 25 GPM @3400rpm. These pumps are designed to mount to a standard 56C face motor. A Submersible or Dry mount motor can be used.
- * Submersible Commercial :
Twenty one models ranging from 33 to 255GPM @ 3400rpm. Standardized shaft and mounting dimensions allow for mounting to all common submersible motors.
- * Dry Hydraulic Commercial:
Thirteen models with flows ranging from 41 to 321 GPM



Electro-Mech Industries

2420 Hamilton Rd., Arlington Heights, IL 60005
Phone: (847) 593-4900 Fax (847) 593-1394

SPEC.: SM3501
DATE: Aug. 09

MANUFACTURED BY:



SETTIMA MECCANICA

Elevator Screw Pump

Cross Reference

Submersible Pumps

SETTIMA		ALLWEILER		IMO USA	
MODEL	GPM	MODEL	GPM	MODEL	GPM
GR25 SMU 25L	9.0	20 - 38	8.1	-	
GR25 SMU 30L	11.2	20 - 46	10.8	-	
GR32 SMU 35L	13.2	20 - 50		-	
GR32 SMU 45L	16.2	20 - 56	15.2	-	
GR32 SMU 55L	17.6	40 - 41	17.0	-	
GR32 SMU 75L	23.5	40 - 49	23.0	-	
GR40 SMU 100L	32.2	80 - 36	31.0	-	
GR40 SMU 125L	39.1	80 - 42	37.0	-	
GR40 SMU 150L	46.0	80 - 46	45.0	-	
-		-		187AJ	49.1
GR45 SMU 180L	55.3	140 - 37	54.5	187Y	53.6
		140 - 39	59.0	187P	58.5
GR45 SMU 210L	65.4	140 - 43	65.1	187M	63.7
GR45 SMU 250L	78.5	140 - 46	76.0	187	74.4
GR55 SMU 270L	82.5	-		217Y	83.8
GR55 SMU 300L	93.4	-		217P	93.8
GR55 SMU 330L	103.2	210 - 40	97.2	217M	101.3
-		210 - 43	107.0	-	
GR55 SMU 380L	117.3	210 - 46	122.3	217	118.4
GR60 SMU 440L	139.6	280 - 43	142.7	236G	138.0
GR60 SMU 500L	155.1	280 - 46	162.2	236	156.8
GR70 SMU 560L	167.1	280 - 51	185.2	-	
-		-		236AS	181.6
GR70 SMU 600L	190.0	440 - 40	204.0	276P	196.2
GR70 SMU 660L	211.1	-		276G	220.1
GR70 SMU 800L	246.3	440 - 46	258.9	276	248.8

Comparison Parameters (Submersible):

Pressure: 500 PSI

Pump Speed: 3400 RPM

Oil Viscosity: 150SSU

Dry Mounted Pumps

IMO		SETTIMA	
MODEL	GPM	MODEL	GPM
3D-187	48.0	GR45 SMTU 180L	41.2
		GR45 SMTU 210L	48.8
		GR55 SMTU 250L	63.3
3D-218	81.0	GR55 SMTU 300L	71.1
		GR55 SMTU 330L	79.2
		GR55 SMTU 380L	85.3
3D-250	124.9	GR60 SMTU 440L	101.7
		GR60 SMTU 500L	113.0
		GR70 SMTU 560L	121.8
3D-275	173.0	GR70 SMTU 600L	138.4
		GR70 SMTU 660L	153.6
		GR70 SMTU 800L	179.1
3D-312	261.0	GR80 SMTU 1000L	234.1
		GR80 SMTU 1200L	274.7
3D-350	377.0		

Note: ** Flow at 2400 rpm

Comparison Parameters (Dry Mounted):

Pressure: 400 PSI

Pump Speed: 2500 RPM

Oil Viscosity: 100SSU

Data is subject to change without notice



Electro-Mech Industries

2420 Hamilton Rd., Arlington Heights, IL 60005
Phone: (847) 593-4900 Fax (847) 593-1394

SPEC.: SM3502
DATE: Aug 09

MANUFACTURED BY:



SETTIMA MECCANICA

SUBMERSIBLE PERFORMANCE DATA

3400 RPM, 150SSU

		PRESSURE							
MODEL		250	350	400	500	550	600	700	800
GR 25 25L	GPM	9.3	9.2	9.1	9.0	8.9	8.9	8.8	8.7
	HP	2.0	2.6	2.9	3.6	3.9	4.2	4.8	5.4
GR 25 30L	GPM	11.6	11.5	11.4	11.2	11.2	11.1	11.0	10.9
	HP	2.5	3.3	3.7	4.4	4.8	5.2	6.0	6.8
GR 32 35L	GPM	13.7	13.5	13.4	13.2	13.2	13.1	12.9	12.8
	HP	2.9	3.8	4.2	5.1	5.6	6.1	7.0	7.9
GR 32 45L	GPM	16.8	16.5	16.4	16.2	16.1	16.0	15.8	15.7
	HP	3.5	4.6	5.2	6.3	6.8	7.4	8.5	9.6
GR 32 55L	GPM	18.3	18.0	17.9	17.6	17.5	17.4	17.3	17.1
	HP	3.8	5.0	5.6	6.9	7.5	8.1	9.3	10.5
GR 32 75L	GPM	24.4	24.0	23.8	23.5	23.4	23.3	23.0	22.8
	HP	5.1	6.7	7.5	9.1	9.9	10.8	12.4	14.0
GR 40 100L	GPM	33.4	32.8	32.6	32.2	32.0	31.8	31.5	31.1
	HP	6.8	9.0	10.1	12.3	13.4	14.5	16.7	18.9
GR 40 125L	GPM	40.5	39.9	39.6	39.1	38.8	38.6	38.2	37.8
	HP	8.3	10.9	12.3	15.0	16.3	17.7	20.3	23.0
GR 40 150L	GPM	47.6	46.9	46.6	46.0	45.7	45.4	44.9	44.5
	HP	9.7	12.9	14.5	17.6	19.2	20.8	23.9	27.1
GR 45 180L	GPM	57.3	56.4	56.0	55.3	54.9	54.6	54.0	53.5
	HP	11.6	15.3	17.3	21.0	22.9	24.8	28.6	32.4
GR 45 210L	GPM	67.8	66.8	66.3	65.4	65.1	64.7	64.0	63.4
	HP	13.7	18.1	20.4	24.9	27.1	29.4	33.9	38.4
GR 45 250L	GPM	81.4	80.1	79.6	78.5	78.1	77.6	76.8	76.0
	HP	16.4	21.8	24.5	29.9	32.6	35.3	40.6	46.0
GR 55 270L	GPM	85.6	84.2	83.6	82.5	82.1	81.6	80.7	79.9
	HP	17.0	22.6	25.5	31.1	33.9	36.8	42.4	48.1
GR 55 300L	GPM	96.8	95.3	94.6	93.4	92.9	92.3	91.3	90.4
	HP	19.2	25.6	28.8	35.2	38.4	41.7	48.0	54.4
GR 55 330L	GPM	107.0	105.3	104.5	103.2	102.6	102.0	100.9	99.9
	HP	21.2	28.3	31.8	38.9	42.4	46.0	53.0	60.1
GR 55 380L	GPM	121.6	119.7	118.8	117.3	116.6	115.9	114.7	113.6
	HP	24.1	32.1	36.2	44.3	48.2	52.3	60.3	68.4
GR 60 440L	GPM	144.7	142.5	141.4	139.6	138.8	138.0	136.5	135.1
	HP	28.5	38.0	42.9	52.5	57.2	62.1	71.6	81.2
GR 60 500L	GPM	160.8	158.3	157.2	155.1	154.2	153.3	151.7	150.2
	HP	31.7	42.3	47.7	58.3	63.6	69.0	79.5	90.2
GR 70 560L	GPM	173.3	170.6	169.3	167.1	166.1	165.2	163.4	161.8
	HP	33.8	45.2	51.0	62.5	68.1	74.0	85.4	96.8
GR 70 600L	GPM	197.0	193.9	192.5	190.0	188.9	187.8	185.8	183.9
	HP	38.4	51.4	58.0	71.0	77.5	84.1	97.0	110.1
GR 70 660L	GPM	218.9	215.5	213.9	211.1	209.9	208.7	206.4	204.4
	HP	42.7	57.1	64.4	78.9	86.1	93.4	107.8	122.3
GR 70 800L	GPM	255.4	251.4	249.6	246.3	244.9	243.4	240.8	238.5
	HP	49.8	66.6	75.2	92.1	100.4	109.0	125.8	142.7

Data is subject to change without notice



Electro-Mech Industries

2420 Hamilton Rd., Arlington Heights, IL 60005
Phone: (847) 593-4900 Fax (847) 593-1394

SPEC.: SM3504
DATE: Aug. 09

MANUFACTURED BY:



ZETIMA MECCANICA

PLUNGER SPEED (ft./min.)

DIRECT ACTING 3400 RPM. 350 PSI, 150 SSU

3400 RPM 150SSU C PLUNGER SPEED (FT/MIN) DIRECT ACTING

350PSI

MODEL		GPM	PLUNGER DIAMETER (INCHES)															
			3.88	4.00	4.38	4.44	4.50	5.00	5.38	5.44	6.00	6.50	7.00	7.50	8.00	8.50	9.00	10.00
GR 25	25L	9.2	15.0	14.0	11.7	11.4	11.1	9.0	7.8	-	-	-	-	-	-	-	-	-
	30L	11.5	18.7	17.5	14.7	14.3	13.9	11.2	9.7	9.5	-	-	-	-	-	-	-	-
GR 32	35L	13.5	22.1	20.7	17.3	16.8	16.4	13.2	11.5	11.2	9.2	-	-	-	-	-	-	-
	45L	16.5	27.0	25.3	21.1	20.6	20.0	16.2	14.0	13.7	11.2	9.6	-	-	-	-	-	-
	55L	18.0	29.4	27.6	23.1	22.4	21.8	17.7	15.3	14.9	12.3	10.4	9.0	-	-	-	-	-
	75L	24.0	39.2	36.8	30.8	29.9	29.1	23.5	20.4	19.9	16.4	13.9	12.0	10.5	-	-	-	-
GR 40	100L	32.8	53.6	50.3	42.0	40.9	39.7	32.2	27.9	27.2	22.4	19.0	16.4	14.3	12.6	-	-	-
	125L	39.9	65.1	61.1	51.1	49.6	48.3	39.1	33.8	33.1	27.1	23.1	19.9	17.4	15.3	13.5	-	-
	150L	46.9	76.6	71.9	60.1	58.4	56.8	46.0	39.8	38.9	31.9	27.2	23.5	20.4	18.0	15.9	14.2	-
GR 45	180L	56.4	92.1	86.4	72.2	70.2	68.3	55.3	47.8	46.8	38.4	32.7	28.2	24.6	21.6	19.1	17.1	13.8
	210L	66.8	109.0	102.3	85.5	83.1	80.8	65.5	56.7	55.4	45.5	38.7	33.4	29.1	25.6	22.7	20.2	16.4
	250L	80.1	130.8	122.8	102.6	99.8	97.0	78.6	68.0	66.4	54.6	46.5	40.1	34.9	30.7	27.2	24.3	19.6
GR 55	270L	84.2	137.5	129.1	107.9	104.9	102.0	82.6	71.5	69.8	57.4	48.9	42.1	36.7	32.3	28.6	25.5	20.6
	300L	95.3	155.6	146.0	122.1	118.7	115.4	93.5	80.9	79.0	64.9	55.3	47.7	41.5	36.5	32.3	28.8	23.4
	330L	105.3	171.9	161.3	134.8	131.1	127.5	103.2	89.3	87.3	71.7	61.1	52.7	45.9	40.3	35.7	31.9	25.8
	380L	119.7	195.4	183.4	153.3	149.0	144.9	117.4	101.6	99.2	81.5	69.5	59.9	52.2	45.8	40.6	36.2	29.3
GR 60	440L	142.5	232.6	218.3	182.4	177.3	172.4	139.7	120.9	118.1	97.0	82.7	71.3	62.1	54.6	48.3	43.1	34.9
	500L	158.3	258.4	242.5	202.7	197.0	191.6	155.2	134.3	131.2	107.8	91.8	79.2	69.0	60.6	53.7	47.9	38.8
GR 70	560L	170.6	-	261.3	218.4	212.3	206.5	167.2	144.7	141.4	116.1	99.0	85.3	74.3	65.3	57.9	51.6	41.8
	600L	193.9	-	-	248.3	241.4	234.7	190.1	164.5	160.8	132.0	112.5	97.0	84.5	74.3	65.8	58.7	47.5
	660L	215.5	-	-	-	268.2	260.8	211.2	182.8	178.6	146.7	125.0	107.8	93.9	82.5	73.1	65.2	52.8
	800L	251.4	-	-	-	-	-	246.5	213.3	208.4	171.1	145.8	125.7	109.5	96.3	85.3	76.1	61.6

Data is subject to change without notice



Electro-Mech Industries

250 Hamilton Rd., Arlington Heights, IL 60005
Phone: (847) 593-4900 Fax (847) 593-1394

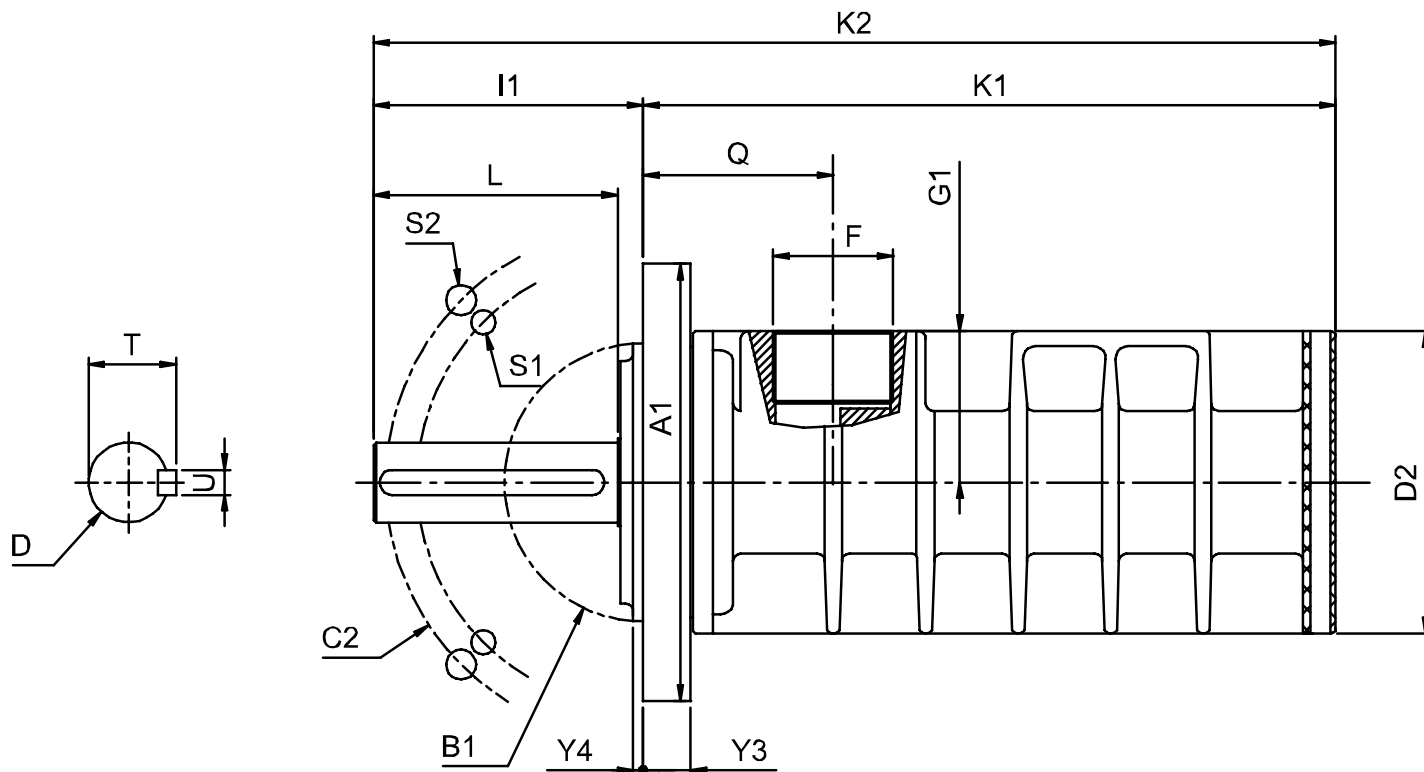
SPEC.: SM3505
DATE: JAN '15

MANUFACTURED BY:



ZETIMA MECCANICA

SUBMERSIBLE PUMP DIMENSIONS



MODEL	PUMP					SHAFT				DISCHARGE	
	D2	I1	K1	K2	Q	D (min)	T	U	L	F (NPT)	G1
GR20	2.36	1.61	7.05	8.66	2.36	0.55	0.63	0.2	1.22	1/2"	1.18
GR25	3.43	2.24	8.87	11.11	2.36	0.7472	0.85	0.23	1.38	1"	1.77
GR32	3.43	2.2	8.65	10.85	2.04	0.7472	0.85	0.23	1.38	1"	1.77
GR40	4.37	2.28	9.67	11.95	2.4	0.7472	0.85	0.23	1.38	1-1/4"	2.17
GR45	4.8	4.25	10.91	15.16	2.99	1.2591	1.38	0.39	3.84	2"	2.38
GR55	5.55	4.25	12.6	16.85	2.64	1.2591	1.38	0.39	3.84	2"	2.78
GR60	6.55	4.25	13.45	17.7	3.15	1.2591	1.38	0.39	3.84	2"	3.25
GR70	7.09	4.19	21.16	25.35	3.25	1.2591	1.38	0.39	3.84	2 1/2"	3.54

MODEL	FLANGE								WEIGHT
	A1	B1	C1	C2	S1/QTY	S2/QTY	Y3	Y4	NET
GR20	5.04 SAE	3.25	4.17	-	0.47/2	-	0.39	0.31	4.5
GR25	6.1 RND	3.15	5.31	-	0.37 / 2	-	0.61	0.83	9.5
GR32	6.1 RND	3.15	5.31	-	0.37 / 2	-	0.54	0.06	9.5
GR40	6.1 RND	4.33	5.31	-	0.37 / 2	-	0.24	0.12	14.5
GR45	6.89 SQ	4.37	7.12	8.11	0.37 / 4	0.47 / 4	0.79	0.16	21.4
GR55	6.89 SQ	4.37	7.12	8.11	0.37 / 4	0.47 / 4	0.79	0.16	33.1
GR60	6.89 SQ	4.37	7.12	8.11	0.37 / 4	0.47 / 4	0.79	0.16	39.7
GR70	6.89 SQ	4.37	7.12	8.11	0.37 / 4	0.47 / 4	0.79	0.16	59.5



Electro-Mech Industries

2420 Hamilton Rd., Arlington Heights, IL 60005
Phone: (847) 593-4900 Fax (847) 593-1394

SPEC.: SM3503
DATE: Aug. 11

MANUFACTURED BY:



Dry Mounted Elevator Pumps

Determining Flow Rate (GPM) from Car Speed (ft./min.)

CAR SPEED	PLUNGER DIAMETER (INCHES)														
	3 7/8	4	4 3/8	4 1/2	5	5 3/8	5 1/2	6	6 1/2	7	7 1/2	8	8 1/2	9	10
10	6	7	8	8	10	12	12	15	17	20	23	26	29	33	41
20	12	13	16	17	20	24	25	29	34	40	46	52	59	66	82
30	18	20	23	25	31	35	37	44	52	60	69	78	88	99	122
40	24	26	31	33	41	47	49	59	69	80	92	104	118	132	163
50	31	33	39	41	51	59	62	73	86	100	115	130	147	165	204
60	37	39	47	50	61	71	74	88	103	120	138	156	177	198	245
70	43	46	55	58	71	82	86	103	121	140	160	183	206	231	285
80	49	52	62	66	82	94	99	117	138	160	183	209	236	264	326
90	55	59	70	74	92	106	111	132	155	180	206	235	265	297	367
100	61	65	78	83	102	118	123	147	172	200	229	261	294	330	408
110	67	72	86	91	112	130	136	161	189	220	252	287	324	363	448
120	73	78	94	99	122	141	148	176	207	240	275	313	353	396	489
130	80	85	101	107	132	153	160	191	224	260	298	339	383	429	530
140	86	91	109	116	143	165	173	205	241	280	321	365	412	462	571
150	92	98	117	124	153	177	185	220	258	300	344	391	442	495	611
160	98	104	125	132	163	188	197	235	275	319	367	417	471	528	652
170	104	111	133	140	173	200	210	249	293	339	390	443	501	561	693
180	110	117	140	149	183	212	222	264	310	359	413	469	530	594	734
190	116	124	148	157	194	224	234	279	327	379	436	496	559	627	774
200	122	130	156	165	204	235	247	293	344	399	458	522	589	660	815
210	128	137	164	173	214	247	259	308	362	419	481	548	618	693	856
220	135	143	172	182	224	259	271	323	379	439	504	574	648	726	897
230	141	150	179	190	234	271	284	337	396	459	527	600	677	759	937



Electro-Mech Industries

2420 Hamilton Rd., Arlington Heights, IL 60005
Phone: (847) 593-4900 Fax (847) 593-1394

SPEC.: SM3507
DATE: Aug. 09

MANUFACTURED BY:



ZETIMA MECCANICA

Dry Mounted Elevator Pumps

Horsepower requirements

GPM	FULL LOAD PRESSURE (PSI)											
	250	300	350	400	450	500	550	600	650	700	750	800
40	8	9	11	12	14	16	17	19	20	22	23	25
50	10	12	14	16	18	19	21	23	25	27	29	31
60	12	14	16	19	21	23	26	28	30	33	35	37
70	14	16	19	22	25	27	30	33	35	38	41	44
75	15	18	20	23	26	29	32	35	38	41	44	47
80	16	19	22	25	28	31	34	37	40	44	47	50
90	18	21	25	28	32	35	39	42	46	49	53	56
100	19	23	27	31	35	39	43	47	51	54	58	62
110	21	26	30	34	39	43	47	51	56	60	64	68
120	23	28	33	37	42	47	51	56	61	65	70	75
125	24	29	34	39	44	49	53	58	63	68	73	78
130	25	30	35	40	46	51	56	61	66	71	76	81
140	27	33	38	44	49	54	60	65	71	76	82	87
150	29	35	41	47	53	58	64	70	76	82	88	93
160	31	37	44	50	56	62	68	75	81	87	93	100
170	33	40	46	53	60	66	73	79	86	93	99	106
175	34	41	48	54	61	68	75	82	88	95	102	109
180	35	42	49	56	63	70	77	84	91	98	105	112
190	37	44	52	59	67	74	81	89	96	103	111	118
200	39	47	54	62	70	78	86	93	101	109	117	124
210	41	49	57	65	74	82	90	98	106	114	123	131
220	43	51	60	68	77	86	94	103	111	120	128	137
225	44	53	61	70	79	88	96	105	114	123	131	140
230	45	54	63	72	81	89	98	107	116	125	134	143
240	47	56	65	75	84	93	103	112	121	131	140	149
250	49	58	68	78	88	97	107	117	126	136	146	156
260	51	61	71	81	91	101	111	121	131	142	152	162
270	53	63	74	84	95	105	116	126	137	147	158	168
275	53	64	75	86	96	107	118	128	139	150	160	171
280	54	65	76	87	98	109	120	131	142	152	163	174
290	56	68	79	90	102	113	124	135	147	158	169	180
300	58	70	82	93	105	117	128	140	152	163	175	187
310	60	72	84	96	109	121	133	145	157	169	181	193
320	62	75	87	100	112	124	137	149	162	174	187	199
325	63	76	88	101	114	126	139	152	164	177	190	202



Electro-Mech Industries

2420 Hamilton Rd., Arlington Heights, IL 60005
Phone: (847) 593-4900 Fax (847) 593-1394

SPEC.: SM3508
DATE: Aug. 09

MANUFACTURED BY:



ZETIMA MECCANICA

Dry Mounted Pumps

Pump Shaft Speed

● Pressure: 400 PSI ● Viscosity: 100 SSU

	Flow Rate (GPM)											
	30	40	50	60	70	75	80	90	100	110	120	130
GR 45 SMTU 180L	1909	2489	3071									
GR 45 SMTU 210L			2618	3110								
GR 55 SMTU 250L				2498	2888	3083	3278					
GR 55 SMTU 300L					2571	2743	2915	3260				
GR 55 SMTU 330L							2654	2966	3278	3591		
GR 55 SMTU 380L								2628	2902	3177		
GR 60 SMTU 440L									2465	2695	2925	3156
GR 60 SMTU 500L											2649	2856
GR 70 SMTU 560L											2470	2662

	Flow Rate (GPM)											
	140	150	160	170	175	180	190	200	210	220	225	230
GR 70 SMTU 560L	2854	3047	3240	3433	3530							
GR 70 SMTU 600L	2530	2699	2869	3038	3123	3208						
GR 70 SMTU 660L		2446	2598	2750	2826	2902	3055					
GR 70 SMTU 800L					2446	2511	2641					
GR 80 SMTU 1000L								2161	2261	2360	2410	2460

	Flow Rate (GPM)					
	240	250	260	270	275	280
GR 80 SMTU 1000L	2560					
GR 80 SMTU 1200L		2220	2302	2384	2425	2466

Data is subject to change without notice



Electro-Mech Industries

2420 Hamilton Rd., Arlington Heights, IL 60005
Phone: (847) 593-4900 Fax (847) 593-1394

SPEC.: SM3509
DATE: Aug. 09

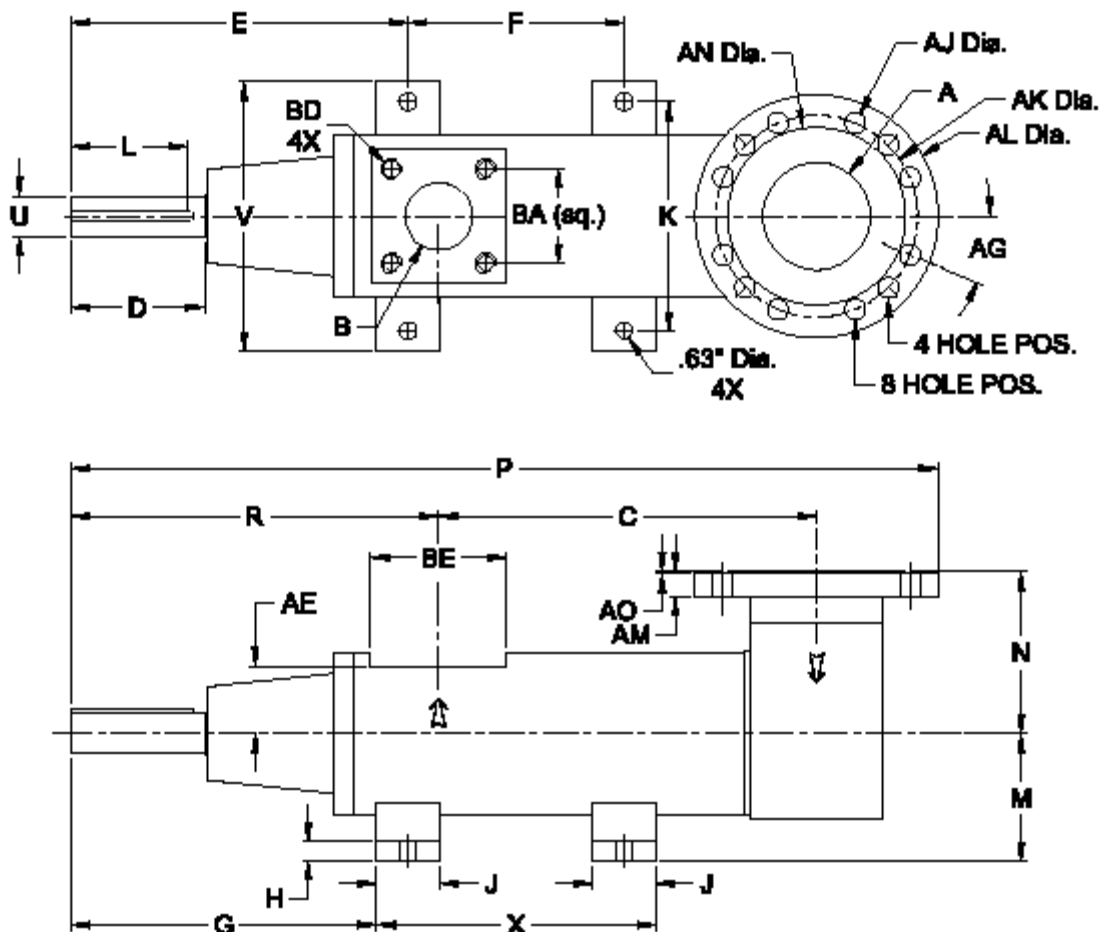
MANUFACTURED BY:



ZETIMA MECCANICA

Dry Mounted Elevator Pumps

Dimensional Data



PUMP MODEL	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	U
GR45	2.5"NPT	1.73	8.89	3.31	8.81	4.87	7.75	0.50	1.57	6.25	2.99	3.51	3.39	19.74	9.06	1.13
GR55	3.00	2.00	12.15	4.96	12.37	6.63	10.80	0.63	2.36	7.50	4.33	4.00	5.04	29.16	13.26	1.50
GR60	4.00	2.50	14.04	4.96	12.51	8.00	11.33	0.75	2.36	8.50	4.33	4.74	6.00	32.17	13.63	1.50
GR70	3.54	3.00	15.39	4.55	12.09	8.94	10.71	1.18	2.76	9.00	4.25	5.12	6.69	33.48	13.58	1.87
GR80	3.54	3.00	17.52	4.65	11.99	10.19	9.63	1.97	3.15	10.47	4.25	5.10	6.25	35.21	13.20	2.00

PUMP MODEL	V	X	AE	AG	AJ	AK	AL	AM	AN	AO	BA	BD	BE	KEY SQ.	WT. (lbs.)
GR45	7.50	7.00	2.03	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.625	5/8-11	3.937	1/4"	40
GR55	9.00	9.78	2.18	45	3/4x4	6.00	7.50	0.75	5	0.06	3.06	5/8-11	5	3/8"	77
GR60	10.00	10.36	2.50	23	3/4x8	7.50	9.00	0.94	6.19	0.06	3.5	3/4-10	5	3/8"	93
GR70	11.00	11.65	2.87	0	3/4x8	7.50	9.00	0.79	6.19	0.06	4.12	7/8-9	5.39	1/2"	124
GR80	11.97	14.91	2.80	23	3/4x8	7.50	9.00	0.94	N/A	N/A	4.12	7/8-9	6	1/2"	174

Data is subject to change without notice



Electro-Mech Industries

2420 Hamilton Rd., Arlington Heights, IL 60005
Phone: (847) 593-4900 Fax (847) 593-1394

SPEC.: SM3506
DATE: Sept. 09

MANUFACTURED BY:



ZETIMA MECCANICA

KV 1/2" solenoid valves are designed for small hydraulic lifts operating at speeds up to 0.16 m/s (32 fpm) depending on the valve selected. The smooth and accurate ride characteristics of the KV2S valve which includes 'soft stop' in both directions, render it highly suitable for quality home lifts and lifts for the handicapped.

Flow Range: 5-80 l/min. (1.3-20 gpm) - see flow pressure charts on page 6

Oil Viscosity: 25-60 mm²/sec. at 40°C (15-35 cSt. at 120°F)

Solenoids AC: 24 V/1.8 A, 42 V/1.0 A, 110 V/0.5 A, 230 V/0.18 A, 50/60 Hz

Solenoids DC: 12 V/2.1 A, 24 V/1.1 A, 42 V/0.6 A, 80 V/0.3 A, 125 V/0.25 A, 196 V/0.14 A.

Ports: P Pump, Z Cylinder and T Tank all G1/2"

Insulation Class, AC and DC: IP 68

Pressure Range: 3-100 bar (45-1500 psi)

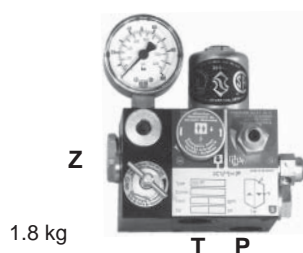
Burst Pressure: 500 bar (7500 psi)

Max. Oil Temperature: 70°C (158°F)



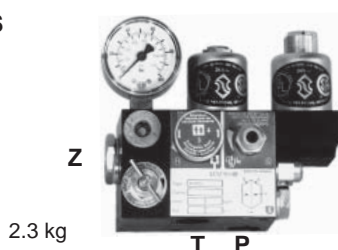
Speeds max. (EN code)

KV1P



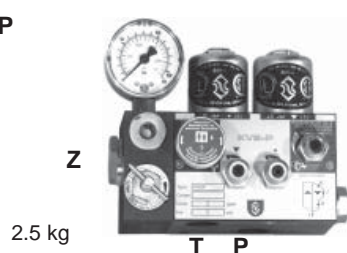
- Up** One up speed, 0.16 m/s (32 fpm) max.
Up start has built-in damping.
Up stop has no damping (pump stops).
- Down** One down speed, 0.16 m/s (32 fpm) max.
Down start has adjustable damping.
Down speed is adjustable.
Down stop has built-in damping.

KV1S



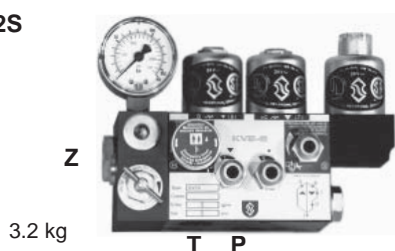
- Up** One up speed 0.16 m/s (32 fpm) max. with soft stop, or 0.4 m/s (80 fpm) max. with overtravel and releveling.
Up start has built-in damping.
Up stop has adjustable damping (delayed pump stop required).
- Down** One down speed, 0.16 (32 fpm) max.
Down start has adjustable damping.
Down speed is adjustable.
Down stop has built-in damping.

KV2P



- Up** One up speed, 0.16 m/s (32 fpm) max.
Up start has built-in damping.
Up stop has no damping (pump stops).
- Down** Two down speeds, 1 m/s (200 fpm) max.
Down start has adjustable damping.
Fast down speed and leveling speeds are adjustable.
Slow down and stop have built-in damping.

KV2S



- Up** One up speed, 0.16 m/s (32 fpm) max. with soft stop, or 0.4 m/s (80 fpm) max. with overtravel and releveling.
Up start has built-in damping.
Up stop has adjustable damping (delayed pump stop required).
- Down** Two down speeds, 1 m/s (200 fpm) max.
Down start has adjustable damping.
Fast down speed and leveling speeds are adjustable.
Slow down and stop have built-in damping.

Control Elements

- A Solenoid 'Up Stop'
C Solenoid 'Down Deceleration'
D Solenoid 'Down Stop'
U Bypass Valve
H Manual Lowering

- V Check Valve
X Down Valve
Y Down Level Valve
F Main Filter
S Relief Valve

Adjustments UP

- 1 Bypass
5 Up Soft Stop
Up Acceleration built-in

Adjustments DOWN

- 6 Down Acceleration
7 Down Full Speed
9 Down Leveling Speed
Down Deceleration built-in
H Manual Down Speed Adjuster

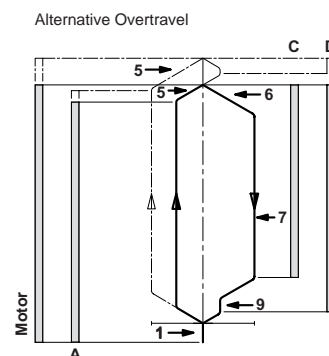
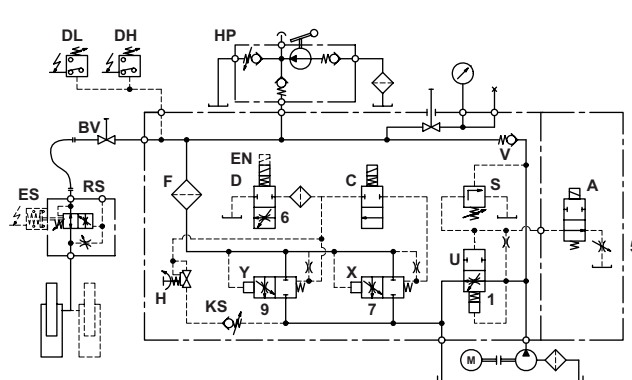
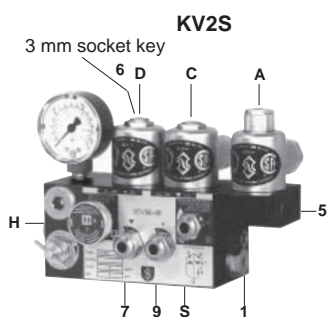
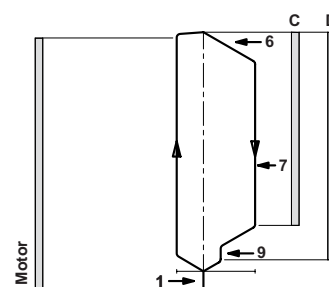
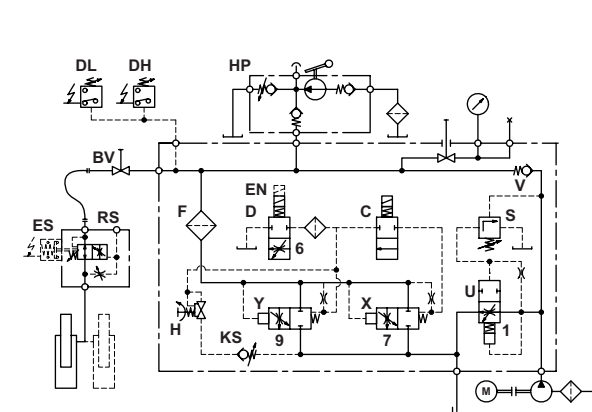
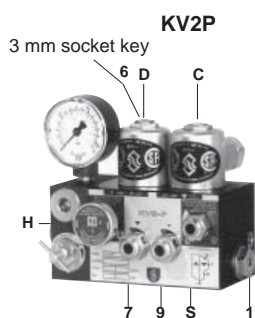
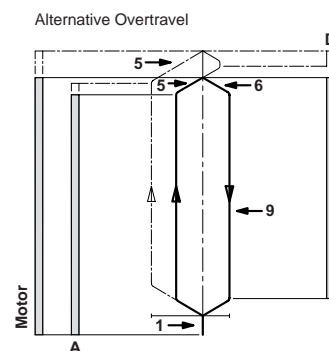
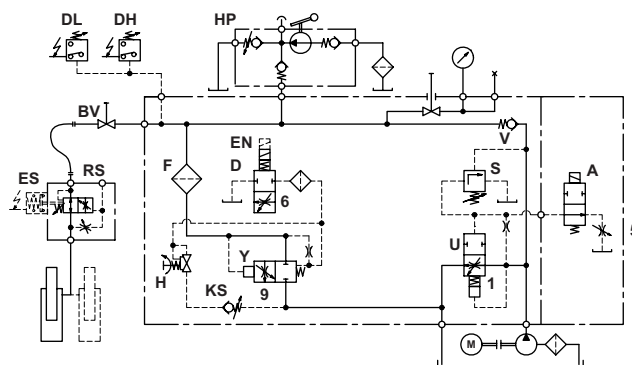
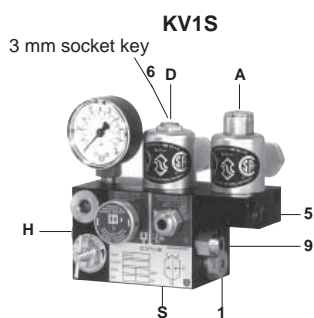
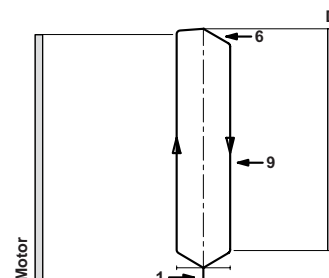
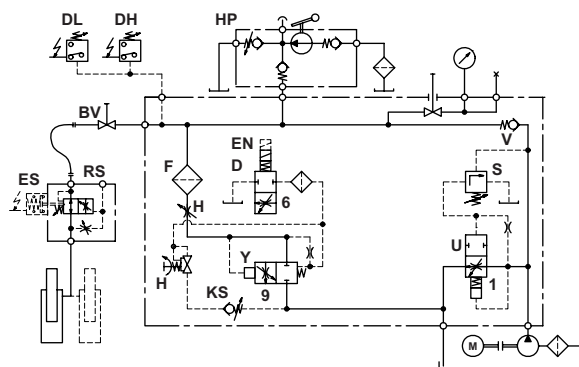
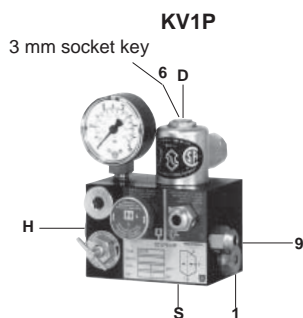
For Options:

BV, EN, HP,
KS, DH, DL and (H) 1
see page 4.



Hydraulic Circuit

Electrical Sequence





Warning: Only qualified personell should adjust or service valves. Unauthorised manipulation may result in injury, loss of life or damage to equipment. Prior to servicing internal parts, ensure that the electrical power is switched off and residual pressure in the valve is reduced to zero.

Valves are already tested and adjusted. Check electrical operation before changing valve settings. Test that the correct solenoid is energized by removing nut and raising solenoid slightly to feel pull.

Nominal Settings: Adjustment **1** level with flange faces. Adjustment **5** (KV1S & KV2S) level with flange faces.

- KV1P**
- 1. Up Bypass:** When the pump is started, the unloaded car should remain stationary at the floor for a period of about 1 second before starting upwards. The length of this delay is according to the setting of adjustment **1**. 'In' (clockwise) shortens the delay, 'out' (c-clockwise) lengthens the delay.
Up Stop: At floor level, the pump-motor is de-energized. The stop may be abrupt depending on load and speed of approach. No adjustment possible.
 - S Relief Valve:** 'In' (clockwise) produces a higher, 'out' (c-clockwise) a lower maximum pressure setting. After turning 'out', open manual lowering **H** for an instant.
Important: When testing relief valve, do not close ball valve sharply.

- KV1S**
- 1. Up Bypass:** When the pump is started, the unloaded car should remain stationary at the floor for a period of about 1 second before starting upwards. The length of this delay is according to the setting of adjustment **1**. 'In' (clockwise) shortens the delay, 'out' (c-clockwise) lengthens the delay.
 - 5. Up Stop:** At floor level solenoid **A** is de-energized. Through a time relay the pump must run approx. 1/2 seconds longer to allow the car to stop smoothly by valve operation according to the setting of adjustment **5**. 'In' (clockwise) provides a softer stop, 'out' (c-clockwise) a quicker stop. Pre-adjustment: With solenoid **A** disconnected and the pump running, **5** should be turned in until the car starts to move up, then slowly backed off again until the car stops.
Alternative Up Stop: At relatively higher speeds and with the time relay arrangements as with 'up stop' above, the car may travel to just above floor level. In overtravelling the floor, down leveling solenoid **D** is energized, lowering the car smoothly back down to floor level where **D** is de-energized.
 - S Relief Valve:** 'In' (clockwise) produces a higher, 'out' (c-clockwise) a lower maximum pressure setting. After turning 'out', open manual lowering **H** for an instant.
Important: When testing relief valve, do not close ball valve sharply.

- KV2P**
- 1. Up Bypass:** When the pump is started, the unloaded car should remain stationary at the floor for a period of about 1 second before starting upwards. The length of this delay is according to the setting of adjustment **1**. 'In' (clockwise) shortens the delay, 'out' (c-clockwise) lengthens the delay.
Up Stop: At floor level, the pump-motor is de-energized. The stop may be abrupt depending on load and speed of approach. No adjustment possible.
 - S Relief Valve:** 'In' (clockwise) produces a higher, 'out' (c-clockwise) a lower maximum pressure setting. After turning 'out', open manual lowering **H** for an instant.
Important: When testing relief valve, do not close ball valve sharply.

- KV2S**
- 1. Up Bypass:** When the pump is started, the unloaded car should remain stationary at the floor for a period of about 1 second before starting upwards. The length of this delay is according to the setting of adjustment **1**. 'In' (clockwise) shortens the delay, 'out' (c-clockwise) lengthens the delay.
 - 5. Up Stop:** At floor level solenoid **A** is de-energized. Through a time relay the pump must run approx. 1/2 seconds longer to allow the car to stop smoothly by valve operation according to the setting of adjustment **5**. 'In' (clockwise) provides a softer stop, 'out' (c-clockwise) a quicker stop. Pre-adjustment: With solenoid **A** disconnected and the pump running, **5** should be turned in until the car starts to move up, then slowly backed off again until the car stops.
Alternative Up Stop: At relatively higher speeds and with the time relay arrangements as with 'up stop' above, the car may travel to just above floor level. In overtravelling the floor, down leveling solenoid **D** is energized, lowering the car smoothly back down to floor level where **D** is de-energized.
 - S Relief Valve:** 'In' (clockwise) produces a higher, 'out' (c-clockwise) a lower maximum pressure setting. After turning 'out', open manual lowering **H** for an instant.
Important: When testing relief valve, do not close ball valve sharply.



Valves are already tested and adjusted. Check electrical operation before changing valves settings. Test that the correct solenoid is energized by removing nut and raising solenoid slightly to feel pull.

KV Nominal Settings: Adjustments 7 & 9, screwheads level with the hexagon heads.

KV1P / KV1S

6. Down Acceleration: When solenoid **D** is energized, the car will accelerate downwards according to the setting of adjustment 6. 'In' (clockwise) provides a softer down acceleration, 'out' (c-clockwise) a quicker acceleration. Pre-adjustment: **6** should be turned all the way in and then solenoid **D** energized. Turn **6** slowly back out until the car accelerates downwards.

9. Down Speed: With solenoid **D** energized as above, the down speed of the car is according to the setting of adjustment 9. 'In' (clockwise) provides a slower down speed, 'out' (c-clockwise) a faster down speed.

Down Stop: At floor level, solenoid **D** is de-energized causing the car to stop. No adjustment necessary.

H Manual Lowering: 'out' (c-clockwise) allows the car to be lowered by hand. Closes automatically on release.

KV2P / KV2S

6. Down Acceleration: When solenoids **C** and **D** are energized, the car will accelerate downwards according to the setting of adjustment 6. 'In' (clockwise) provides a softer down acceleration, 'out' (c-clockwise) a quicker acceleration. Pre-adjustment: **6** should be turned all the way in and then solenoid **C** and **D** energized. Turn **6** slowly back out until the car accelerates downwards.

7. Down Speed: With solenoids **C** and **D** energized as above, the down speed of the car is according to the setting of adjustment 7. 'In' (clockwise) provides a slower down speed, 'out' (c-clockwise) a faster down speed.

Down deceleration: When solenoid **C** is de-energized whilst solenoid **D** remains energized, the car will decelerate according to the built-in damping. No further adjustment will be required.

9. Down Leveling: With solenoid **C** de-energized and solenoid **D** remaining energized, the car will travel at its down leveling speed according to the setting of adjustment 9. 'In' (clockwise) provides a slower, 'out' (c-clockwise) a faster down leveling speed.

Down Stop: At floor level, solenoid **D** is de-energized causing the car to stop. No adjustment necessary.

H Manual Lowering: 'out' (c-clockwise) allows the car to be lowered by hand. Closes automatically on release.

KS Slack Rope Valve: Solenoid **D** must be de-energised! The KS is adjusted with a 3 mm Allan Key by turning the screw **K** 'in' for higher pressure and 'out' for lower pressure. With **K** turned all the way 'in', then half a turn back out, the unloaded car should descend when Manual Lowering **H** is opened. Should the car not descend, **K** must be backed off until the car just begins to descend, then backed off a further half turn to ensure that with cold oil, the car can be lowered as required.

Optional

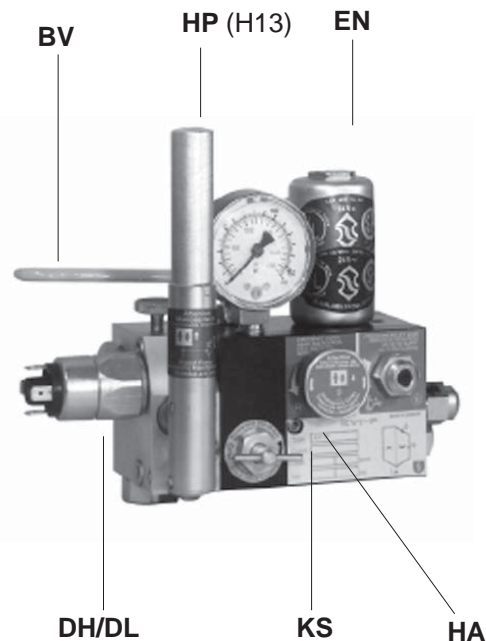
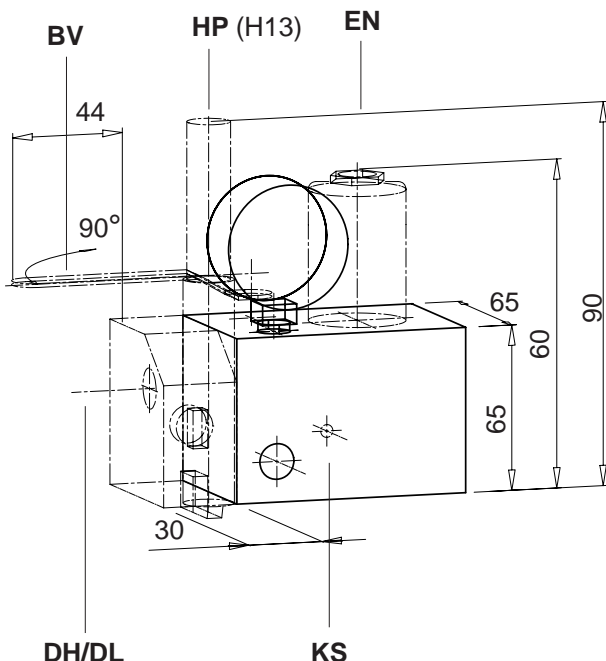
KV Optional Equipment

BV	Ball Valve built in
EN	Emergency Power Solenoid
HP	Hand Pump H 13
KS	Slack Rope Valve
DH	Pressure Switch 10-100 bar
DL	Pressure Switch 1-10 bar
UL	UL/CSA Solenoids
HA	Manual Down Speed Adj.

Separate Equipment

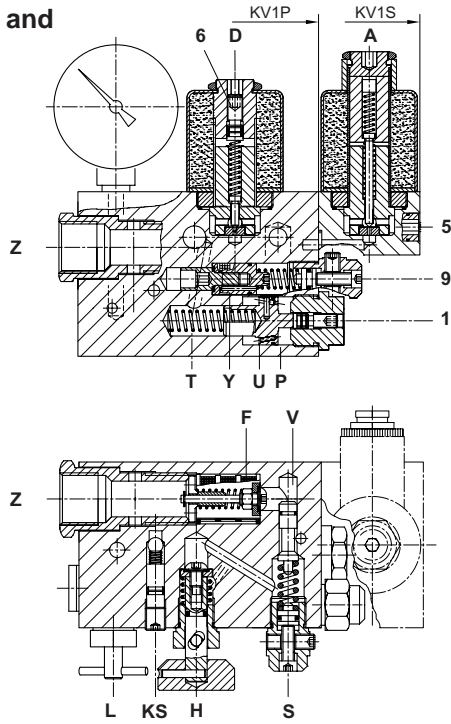
RS	Pipe Rupture Valve
ES	Pipe Rupture Valve End Switch

Options are shown with KV1P Valve. The same Options can be applied to all other KV Valve types .

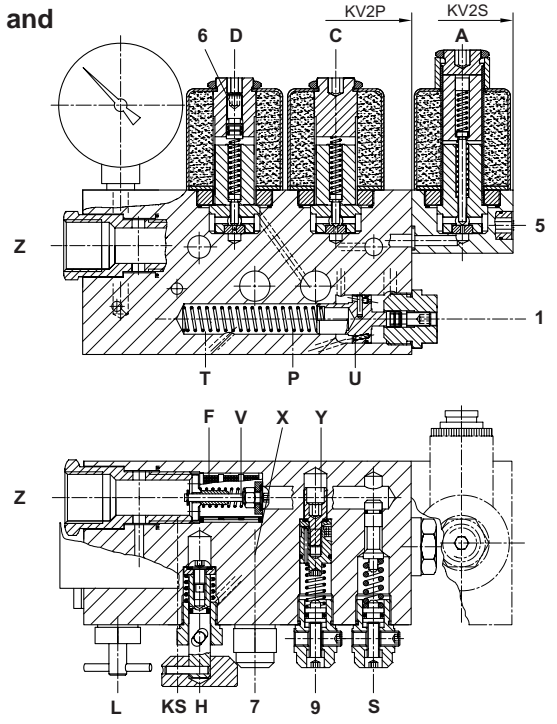


KV Example with Options

KV1P and KV1S



KV2P and KV2S



Control Elements

- A Solenoid ,Up Stop‘
- C Solenoid ,Down Deceleration‘
- D Solenoid ,Down Stop‘
- U Bypass Valve
- V Check Valve
- X Down Valve
- Y Down Leveling Valve
- H Manual Lowering
- L Gauge Shut Off Cock
- F Main Filter

Adjustments

- 1 Bypass
- 5 Soft Stop ,Up‘
- 6 Start ,Down‘
- 7 Speed ,Down‘
- 9 Leveling ,Down‘
- S Relief Valve

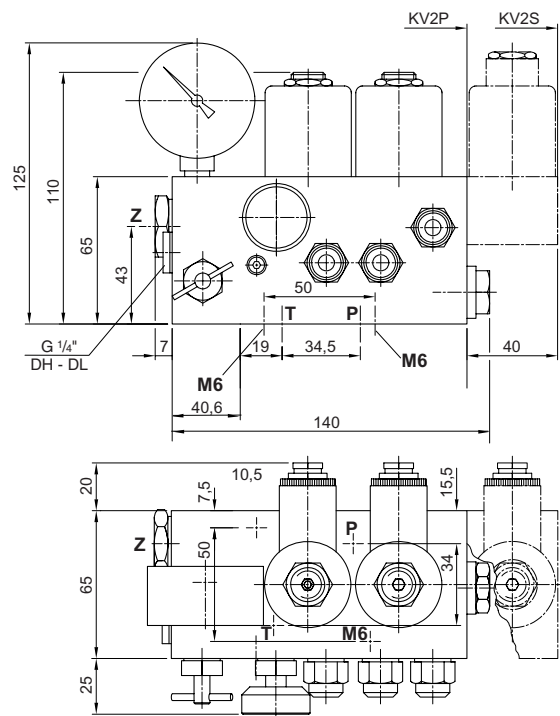
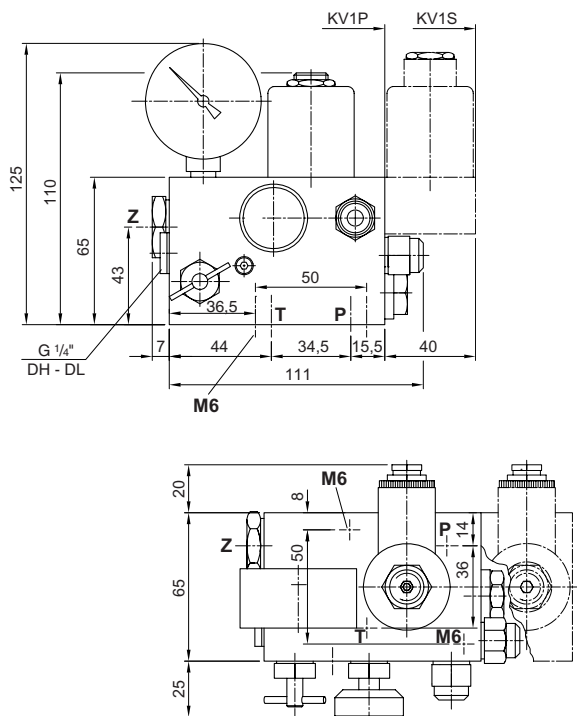
Connections

- P Pump
- T Tank - return
- Z Cylinder



Important: Length of 1/2" thread on pipe connections should not be longer than 14 mm!

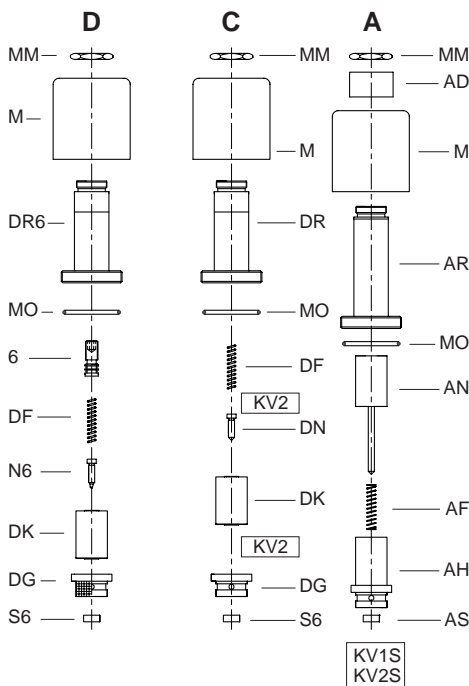
Measurements



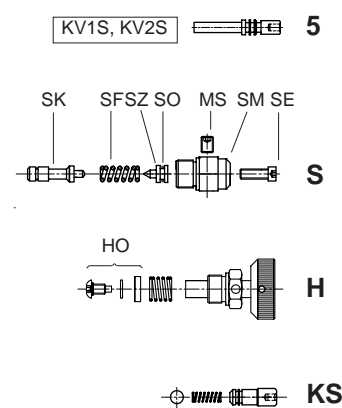


Pos.	No.	Item
1	1F	Flange - Bypass
	1E	Adjustment - Bypass
	EO	O-Ring - Adjustment (3,5x1,5 - P)
	U	Flow Guide - Bypass
	UO	O-Ring - Bypass (17x1 - V)
	UF	Spring - Bypass
5	5	Adjustment - Up Stop
6	6	Adjustment - Down Acceleration
7+9	7E	Adjustment - Down Valve
	9F	Spring - Down Valve
	YO	O-Ring - Flow Guide (10x1 - V)
	XO	Seal - Flow Guide (5.28x1.78 - V)
	XT	O-Ring Disc
	FI	Filter - Down Valve
	X	Down Flow Guide (Brass)
	Y	Down Levelling Flow Guide (Steel) - KV2
	Y	Down Flow Guide (Steel) - KV1
S	SE	Adjustment Screw - Relief Valve
	SM	Hexagonal - Relief Valve
	MS	Locking Screw
	SO	O-Ring - Nipple
	SZ	Nipple - Relief Valve
	SF	Spring - Relief Valve
	SK	Piston - Relief Valve
H	H	Manual Lowering - Self Closing
	HO	Seal - Man. Lowering (O-Ring 5.28x1.78 - V)
h	h	Reduced Lowering Speed
KS	KS	Slack Rope Valve
A	MM	Nut Solenoid
	AD	Collar Solenoid
	M	Coil Solenoid (indicate voltage)
	AR	Tube Solenoid 'Up'
	MO	O-Ring Solenoid
	AN	Needle Solenoid 'Up'
	AF	Spring Solenoid 'Up'
	AH	Seat Housing 'Up'
	AS	Seat Solenoid 'Up'
C+D	M	Coil Solenoid (indicate voltage)
	C	DR Tube - Solenoid 'Down', w/o adj. 6
	D	DR6 Tube Solenoid 'Down', with adj. 6
	MO	O-Ring Solenoid
	DF	Spring Solenoid 'Down'
	DN	Needle Solenoid 'Down'
C	C	
D	N6	Needle Solenoid 'Down' (Nipple)
C	HN	Needle Solenoid 'Down'
	DK	Core Solenoid 'Down'
	DG	Seat Housing 'Down' (Solen.D with screen)
C	S6	Seat Solenoid 'Down'
C	CO	O-Ring Seat Housing
Z	ZA	Cylinder Thread Connection
	V	Check Valve
	VO	O-Ring Check Valve (5,28x1,78 - V)
	F	Main Filter
L	L	Gauge Shut Off Cock

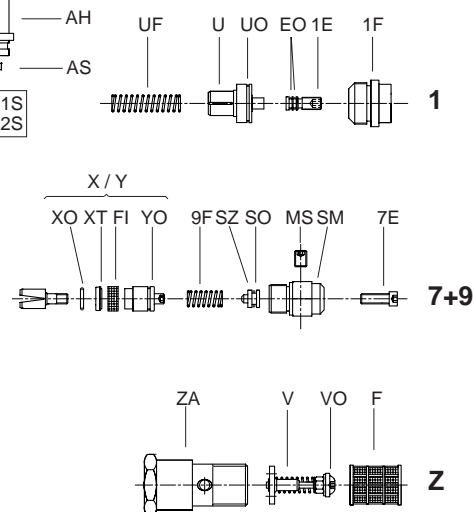
Solenoid Valves



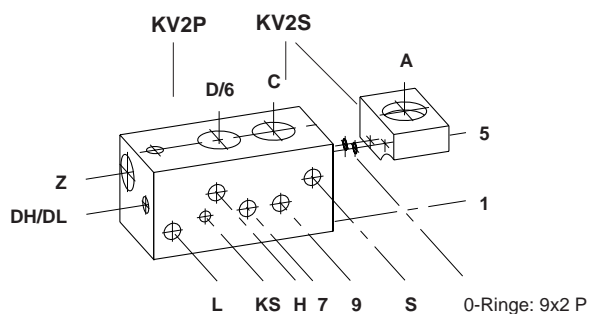
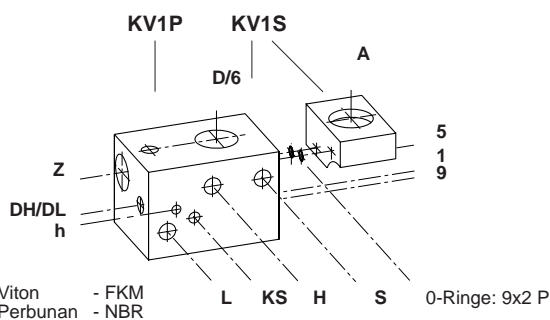
Adjustments



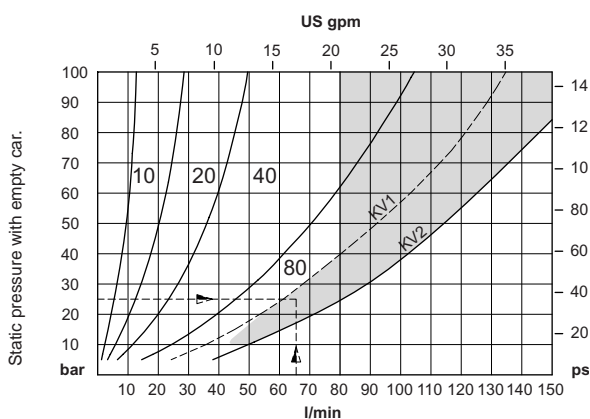
Flow Valves



In case of down leakage, replace and test in the following order:
S6, N6, HO, V complete, XO, (2x XO with KV2).



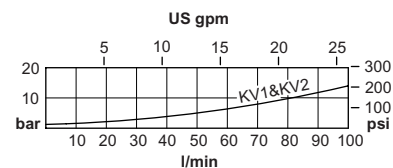
Insert Selection and Down Flow Chart



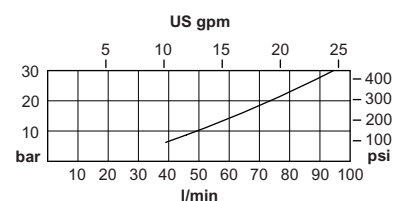
For pressure-flow conditions within shaded area, use 3/4" piping to avoid unnecessary power loss.
Pump flows above 80 l/min. not recommended

Example order
KV2S, 65 l/min, 25 bar (empty),
220WS
or: KV2S/80/220WS

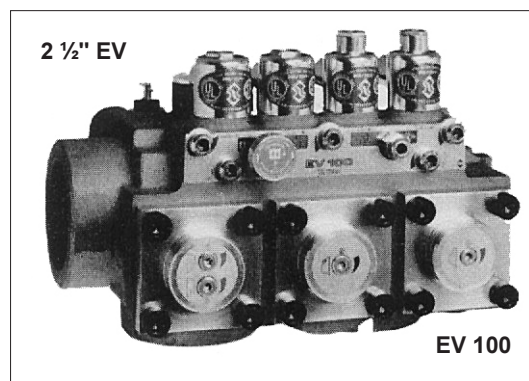
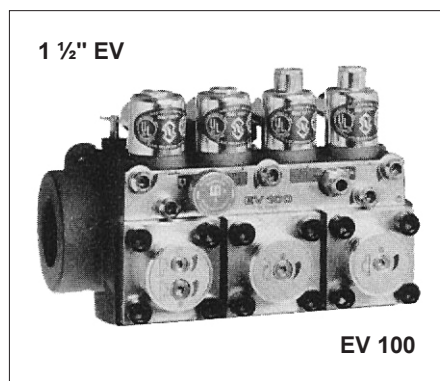
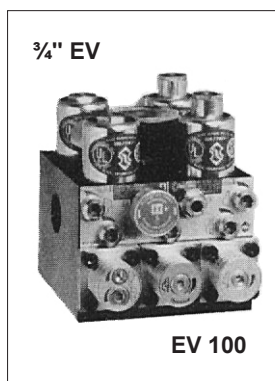
Pressure Drop P - Z



Lowest Relief Pressure



The BLAIN EV 100 program includes the widest range of options offered to the elevator industry for high performance passenger service. Easy to install, EV 100's are smooth, reliable and precise in operation throughout extreme load and temperature variations.



Description

Available port sizes are 3/4", 1 1/2", 2" and 2 1/2" pipe threads, depending on flow. EV 100's start on less than minimum load and can be used for across the line or wye-delta starting. According to customers' information, valves are factory adjusted ready for operation and very simple to readjust if so desired. The patented up levelling system combined with compensated pilot control ensure stability of elevator operation and accuracy of stopping independent of wide temperature variations.

EV 100 valves include the following features essential to efficient installation and trouble free service:



Simple Responsive Adjustment
Temperature and Pressure Compensation
Solenoid Connecting Cables
Pressure Gauge and Shut Off Cock
Self Closing Manual Lowering

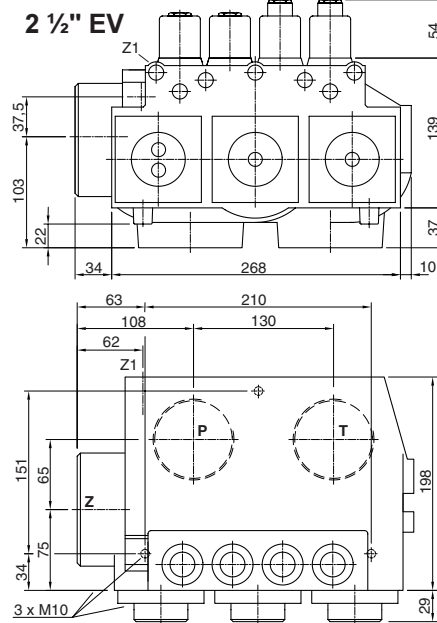
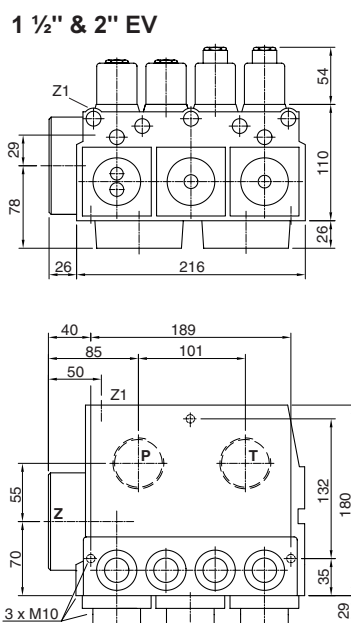
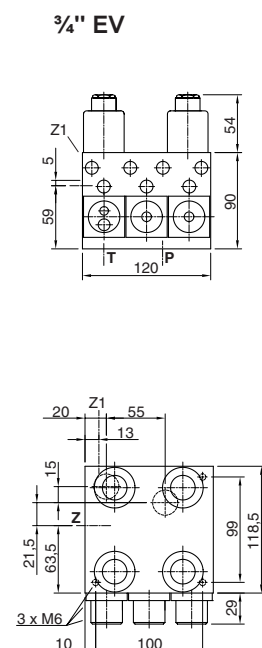
Self Cleaning Pilot Line Filters
Self Cleaning Main Line Filter (Z-T)
Built-in Turbulence Suppressors
70 HRc Rockwell Hardened Bore Surfaces
100% Continuous Duty Solenoids

Technical Data:

		3/4" EV	1 1/2" & 2" EV	2 1/2" EV
Flow Range:	l/min	10-125 (2-33 USgpm)	30-800 (8-208 USgpm)	500-1530 (130-400 USgpm)
Pressure Range:	bar	5-100 (74-1500 psi)	3-100 (44-1500 psi)	3-68 (44-1000 psi)
Press. Range UL/CSA:	bar	5-100 (74-1500 psi)	3-70 (44-1030 psi)	3-47 (44-690 psi)
Burst Pressure Z:	bar	575 (8450 psi)	505 (7420 psi)	265 (3890 psi)
Pressure Drop P-Z:	bar	6 (88 psi) at 125 lpm	4 (58 psi) at 800 lpm	4 (58 psi) at 1530 lpm
Weight:	kg	5 (11 lbs)	10 (22 lbs)	14 (31 lbs)
Oil Viscosity: 25-60 mm ² /sec. at 40°C (15-35 cSt. at 120°F).				
Solenoids AC: 24 V/1.8 A, 42 V/1.0 A, 110 V/0.43 A, 230 V/0.18 A, 50/60 Hz.				
Solenoids DC: 12 V/2.0 A, 24 V/1.1 A, 42 V/0.5 A, 48 V/0.6 A, 80 V/0.3 A, 110 V/0.25 A, 196 V/0.14 A.				

Max. Oil Temperature: 70°C (158°F)

Insulation Class, AC and DC: IP 68



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Fax 07131 485216
<http://www.blain.de>
e-mail: info@blain.de



Manufacturer of the Highest Quality:
Control Valves for Elevators
Tank Heaters - Hand Pumps
Pipe Rupture Valves - Ball Valves



EV Control Valve Types

Optional Equipment

EN Emergency Power Solenoid
UL UL/CSA Solenoids
KS Slack Rope Valve
BV Main Shut-Off Valve
HP Hand Pump

RS Pipe Rupture Valve
ES Pipe Rupture Valve End Switch
DH High Pressure Switch
DL Low Pressure Switch
CX Pressure Compensated Down
MX Auxiliary Down

EV 0

3/4"

1 1/2" and 2" EV

2 1/2"

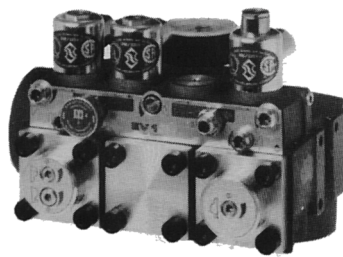


Up Up to 0.16 m/s (32 fpm). 1 Up Speed.
 Up Start is smooth and adjustable.
 Up Stop is by de-energising the pump-motor.

Down Up to 1.0 m/s (200 fpm). 1 Full Speed and 1 Levelling Speed.
 All down functions are smooth and adjustable.

USA Patent No. 4,601,366
 Pats & Pats Pend: France, Germany,
 Italy, Japan, Switzerland & U.K.

EV 1



Up Up to 0.16 m/s (32 fpm). 1 Up Speed.
 Up to 0.4 m/s (80 fpm) by overtravelling and levelling back down.
 Up Start is smooth and adjustable.
 Up Stop is smooth and exact through valve operation whereby
 the pump must run approx. 1/2 sec. longer through a time relay.

Down Up to 1.0 m/s (200 fpm). 1 Full Speed and 1 Levelling Speed.
 All down functions are smooth and adjustable.

USA Patent No. 4,601,366
 Pats & Pats Pend: France, Germany,
 Italy, Japan, Switzerland & U.K.

EV 10



Up Up to 1.0 m/s (200 fpm). 1 Full Speed and 1 Levelling Speed.
 Up Start and Slow Down are smooth and adjustable.
 Up Levelling speed is adjustable.
 Up Stop is by de-energising the pump-motor.

Down Up to 1.0 m/s (200 fpm). 1 Full Speed and 1 Levelling Speed.
 All down functions are smooth and adjustable.

USA Patent No. 4,637,495
 Pats & Pats Pend: France, Germany,
 Italy, Japan, Switzerland & U.K.

EV 100



Up Up to 1.0 m/s (200 fpm). 1 Full Speed and 1 Levelling Speed.
 All 'up' functions are smooth and adjustable.
 Up Levelling speed is adjustable.
 Up Stop is smooth and exact through valve operation whereby
 the pump must run approx. 1/2 sec. longer through a time relay.

Down Up to 1.0 m/s (200 fpm). 1 Full Speed and 1 Levelling Speed.
 All down functions are smooth and adjustable.

USA Patent No. 4,637,495
 Pats & Pats Pend: France, Germany,
 Italy, Japan, Switzerland & U.K.



Warning: Only qualified personell should adjust or service valves. Unauthorised manipulation may result in injury, loss of life or damage to equipment. Prior to servicing internal parts, ensure that the electrical power is switched off and residual pressure in the valve is reduced to zero.



Adjustments UP

Valves are already adjusted and tested. Check electrical operation before changing valve settings. Test that the correct solenoid is energised, by removing nut and raising solenoid slightly to feel pull.

Nominal Settings: Adjustments **1 & 4** approx. level with flange faces. Up to two turns in either direction may then be necessary. Adjustments **2, 3 & 5** all the way 'in' (clockwise) then **2 & 5** two turns 'out' (c-clockwise), **3** three turns out. A small final adjustment may be necessary.

EV 0

- 1. By Pass:** When the pump is started, the unloaded car should remain stationary at the floor for a period of 1 to 2 seconds before starting upwards. The length of this delay is determined by the setting of adjustment **1**. 'In' (clockwise) shortens the delay, 'out' (c-clockwise) lengthens the delay.
- 2. Up Acceleration:** With the pump running, the car will accelerate according to the setting of adjustment **2**. 'In' (clockwise) provides a softer acceleration, 'out' (c-clockwise) a quicker acceleration.
Up Stop: The pump-motor is de-energised. There is no adjustment.
Alternative Up Stop with Over-travel: The motor is de-energised at floor level. Through the flywheelaction of the pump-motor drive the car will travel to just above floor level. In overtravelling the floor, down levelling solenoid **D** is energised, lowering the car smoothly back down to floor level where **D** is de-energised.
- S Relief Valve:** 'In' (clockwise) produces a higher, 'out' (c-clockwise) a lower maximum pressure setting. After turning 'out', open manual lowering **H** for an instant.
Important: When testing relief valve, do not close ball valve sharply.

EV 1

- 1. By Pass:** When the pump is started and solenoid **A** energised, the unloaded car should remain stationary at the floor for a period of 1 to 2 seconds before starting upwards. The length of this delay is determined by the setting of adjustment **1**. 'In' (clockwise) shortens the delay, 'out' (c-clockwise) lengthens the delay.
- 2. Up Acceleration:** With the pump running and solenoid **A** energised as in **1**, the car will accelerate according to the setting of adjustment **2**. 'In' (clockwise) provides a softer acceleration, 'out' (c-clockwise) a quicker acceleration.
- 5. Up Stop:** At floor level, solenoid **A** is de-energised. Through a time relay the pump should run approx. ½ second longer to allow the car to stop smoothly by valve operation according to the setting of adjustment **5**. 'In' (clockwise) provides a softer stop, 'out' (c-clockwise) a quicker stop.
Alternative Up Stop: At relatively higher speeds, the car will travel to just above floor level. In overtravelling the floor, down levelling solenoid **D** is energised, lowering the car smoothly back down to floor level where **D** is de-energised.
- S Relief Valve:** 'In' (clockwise) produces a higher, 'out' (c-clockwise) a lower maximum pressure setting. After turning 'out', open manual lowering **H** for an instant.
Important: When testing relief valve, do not close ball valve sharply.

EV 10

- 1. By Pass:** When the pump is started and solenoid **B** energised, the unloaded car should remain stationary at the floor for a period of 1 to 2 seconds before starting upwards. The length of this delay is determined by the setting of adjustment **1**. 'In' (clockwise) shortens the delay, 'out' (c-clockwise) lengthens the delay.
- 2. Up Acceleration:** With the pump running and solenoid **B** energised as in **1**, the car will accelerate according to the setting of adjustment **2**. 'In' (clockwise) provides a softer acceleration, 'out' (c-clockwise) a quicker acceleration.
- 3. Up Deceleration:** When solenoid **B** is de-energised, the car will decelerate according to the setting of adjustment **3**. 'In' (clockwise) provides a softer deceleration, 'out' (c-clockwise) a quicker deceleration.
- 4. Up Levelling:** With solenoid **B** de-energised as in **3**, the car will proceed at its levelling speed according to the setting of adjustment **4**. 'In' (clockwise) provides a slower, 'out' (c-clockwise) a faster up levelling.
Up stop: The pump-motor is de-energised. There is no adjustment.
- S Relief Valve:** 'In' (clockwise) produces a higher, 'out' (c-clockwise) a lower maximum pressure setting. After turning 'out', open manual lowering **H** for an instant.
Important: When testing relief valve, do not close ball valve sharply.

EV 100

- 1. By Pass:** When the pump is started, and solenoids **A** and **B** energised, the unloaded car should remain stationary at the floor for a period of 1 to 2 seconds before starting upwards. The length of this delay is determined by the setting of adjustment **1**. 'In' (clockwise) shortens the delay, 'out' (c-clockwise) lengthens the delay.
- 2. Up Acceleration:** With the pump running and solenoids **A** and **B** energised as in **1**, the car will accelerate according to the setting of adjustment **2**. 'In' (clockwise) provides a softer acceleration, 'out' (c-clockwise) a quicker acceleration.
- 3. Up Deceleration:** When solenoid **B** is de-energised, whilst solenoid **A** remains energised, the car will decelerate according to the setting of adjustment **3**. 'In' (clockwise) provides a softer deceleration, 'out' (c-clockwise) a quicker deceleration.
- 4. Up Levelling:** With solenoid **A** energised and solenoid **B** de-energised as in **3**, the car will proceed at its levelling speed according to the setting of adjustment **4**. 'In' (clockwise) provides a slower, 'out' (c-clockwise) a faster up levelling.
- 5. Up Stop:** At floor level, solenoid **A** is de-energised with solenoid **B** remaining de-energised. Through a time relay the pump should run approx. ½ second longer to allow the car to stop smoothly by valve operation according to the setting of adjustment **5**. 'In' (clockwise) provides a softer stop, 'out' (c-clockwise) a quicker stop.
- S Relief Valve:** 'In' (clockwise) produces a higher, 'out' (c-clockwise) a lower maximum pressure setting. After turning 'out', open manual lowering **H** for an instant.
Important: When testing relief valve, do not close ball valve sharply.



Warning: Only qualified personell should adjust or service valves. Unauthorised manipulation may result in injury, loss of life or damage to equipment. Prior to servicing internal parts, ensure that the electrical controller is switched off and residual pressure in the valve is reduced to zero.



Adjustments DOWN

Valves are already adjusted and tested. Check electrical operation before changing valve settings. Test that the correct solenoid is energised, by removing nut and raising solenoid slightly to feel pull.

Nominal Settings: Adjustments **7 & 9** approx. level with flange face. Two turns in either direction may then be necessary. Adjustments **6 & 8** turn all the way 'in' (clockwise), then three turns 'out' (c-clockwise). One final turn in either direction may be necessary.

6. Down Acceleration: When solenoids **C** and **D** are energised, the car will accelerate downwards according to the setting of adjustment **6**. 'In' (clockwise) provides a softer down acceleration, 'out' (c-clockwise) a quicker acceleration.

7. Down Speed: With solenoids **C** and **D** energised as in **6** above, the full down speed of the car is according to the setting of adjustment **7**. 'In' (clockwise) provides a slower down speed, 'out' (c-clockwise) a faster down speed.

8. Down Deceleration: When solenoid **C** is de-energised whilst solenoid **D** remains energised, the car will decelerate according to the setting of adjustment **8**. 'In' (clockwise) provides a softer deceleration, 'out' (c-clockwise) a quicker deceleration. **Attention: Do not close all the way!**

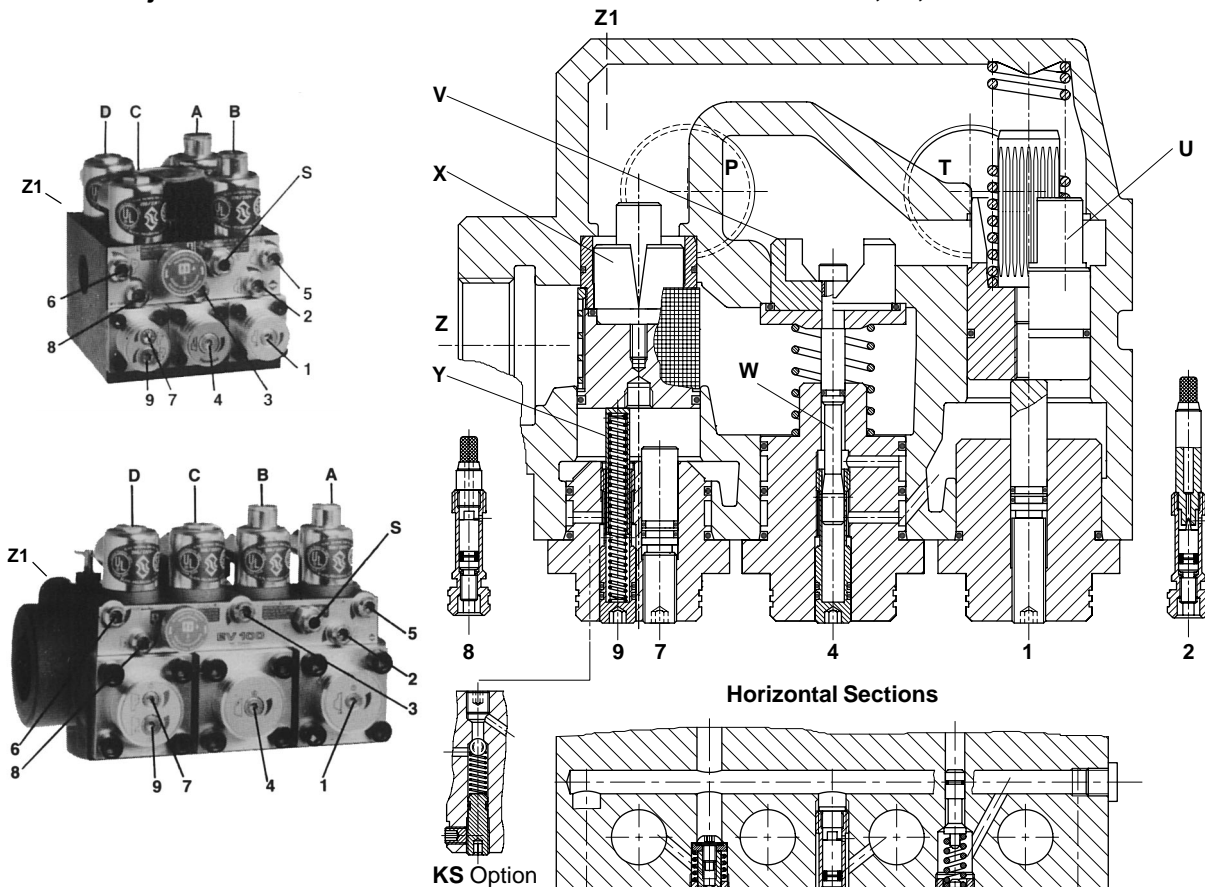
9. Down Levelling: With solenoid **C** de-energised and solenoid **D** energised as in **8** above, the car will proceed at its down levelling speed according to the setting of adjustment **9**. 'In' (clockwise) provides a slower, 'out' (c-clockwise) a faster down levelling speed.

Down Stop: When solenoid **D** is de-energised with solenoid **C** remaining de-energised, the car will stop according to the setting of adjustment **8** and no further adjustment will be required.

KS Slack Rope Valve: The KS is adjusted with a 3 mm Allan Key by turning the screw **K** 'in' for higher pressure and 'out' for lower pressure. With **K** turned all the way 'in', then half a turn back out, the unloaded car should descend when the **D** solenoid alone is energised. Should the car not descend, **K** must be backed off until the car just begins to descend, then backed off a further half turn to ensure that with cold oil, the car can be lowered as required.

Positions of Adjustments

EV 100 1½", 2", 2½"



Adjustments UP

- 1 By Pass
- 2 Up Acceleration
- 3 Up Deceleration
- 4 Up Levelling Speed
- 5 Up Stop

Adjustments DOWN

- 6 Down Acceleration
- 7 Down Full Speed
- 8 Down Deceleration
- 9 Down Levelling Speed

Control Elements

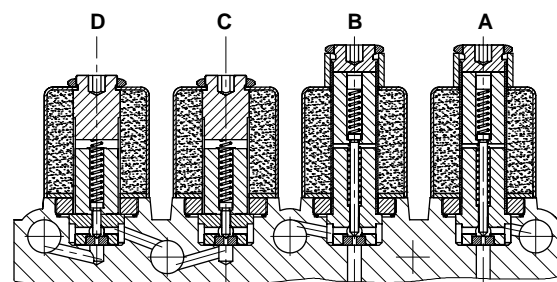
- A Solenoid (Up Stop)
- B Solenoid (Up Deceleration)
- C Solenoid (Down Deceleration)
- D Solenoid (Down Stop)
- H Manual Lowering
- S Relief Valve
- U By Pass Valve
- V Check Valve
- W Levelling Valve (Up)
- X Full Speed Valve (Down)
- Y Levelling Valve (Down)

Valve Types

- EV 0
- EV 1
- EV 10
- EV 100

Elements Omitted

- A, B, W, 3, 4 & 5
- B, W, 3 & 4
- A & 5
- as shown



Vertical Section

Control Elements

- | | |
|---------------------------------------|----------------------------------|
| A Solenoid (Up Stop) | U By Pass Valve |
| B Solenoid (Up Deceleration) | V Check Valve |
| C Solenoid (Down Deceleration) | W Levelling Valve (Up) |
| D Solenoid (Down Stop) | X Full Speed Valve (Down) |
| H Manual Lowering | Y Levelling Valve (Down) |
| S Relief Valve | F Filter |

Adjustments UP

- 1 By Pass
- 2 Up Acceleration
- 3 Up Deceleration
- 4 Up Levelling Speed
- 5 Up Stop

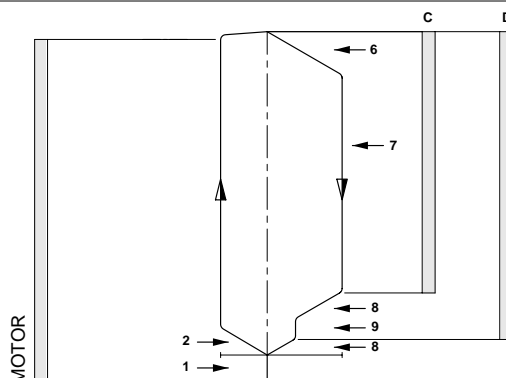
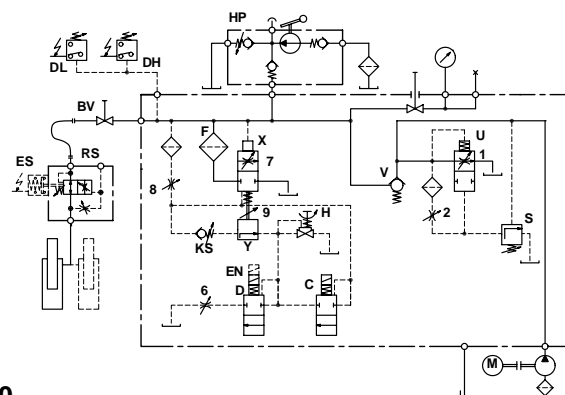
Adjustments DOWN

- 6 Down Acceleration
- 7 Down Full Speed
- 8 Down Deceleration
- 9 Down Levelling Speed

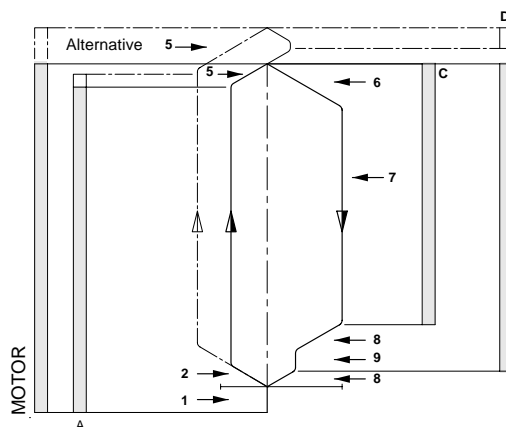
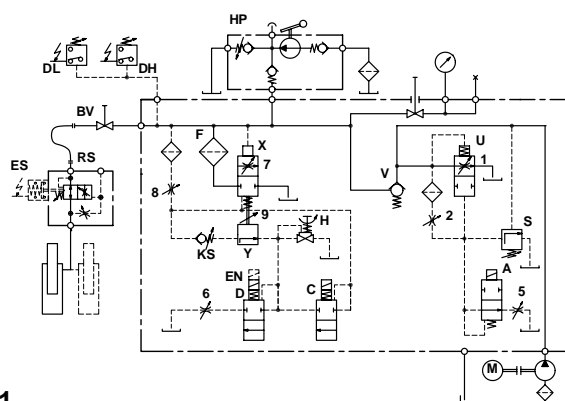
Hydraulic Circuit

Electrical Sequence

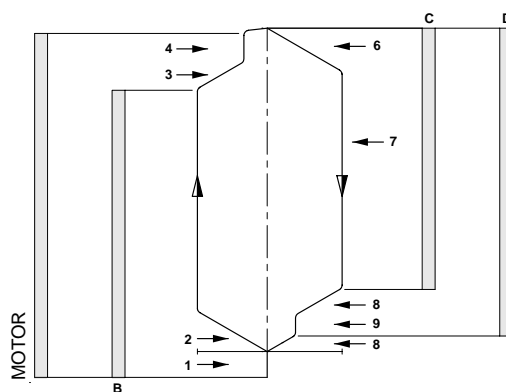
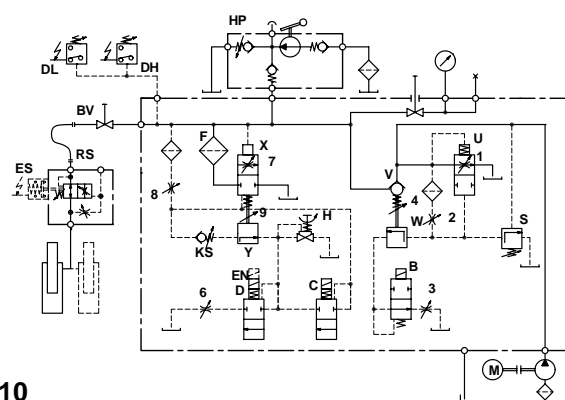
EV 0



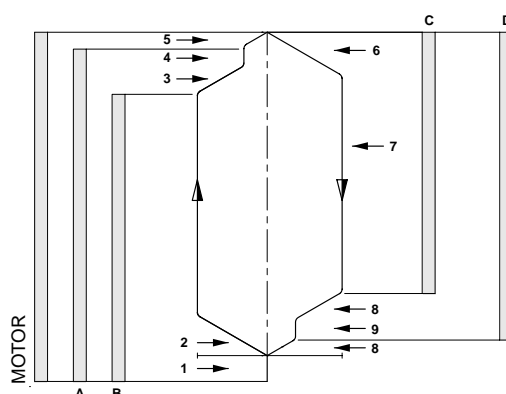
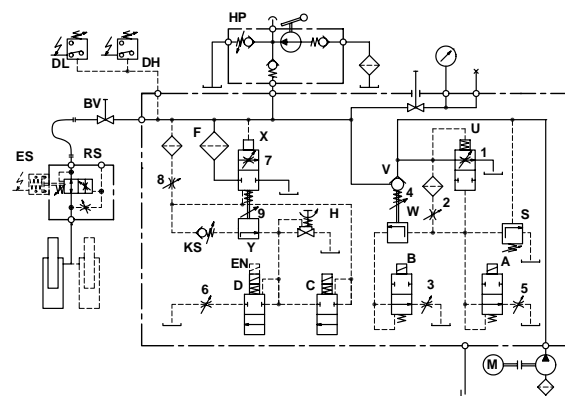
EV 1



EV 10



EV 100





Pos.	No.	Item
1	FS	Lock Screw - Flange
	FO	0-Ring - Flange
	1F	Flange - By Pass
	EO	0-Ring - Adjustment
	1E	Adjustment - By Pass
	UO	0-Ring - By Pass Valve
	U	By Pass Valve
2	UD	Noise Suppressor
	UF	Spring - By Pass
2	2	Adjustment - Up Acceleration
3	3	Adjustment - Up Deceleration
4	EO	0-Ring - Adjustment
	4E	Adjustment - Up Levelling
	4F	Flange - Check Valve
	FO	0-Ring - Flange
	VF	Spring - Check Valve
	W	Up-Levelling Valve
	WO	0-Ring - Up Levelling Valve
	VO	Seal - Check Valve
5	V	Check Valve
	W6	Screw - Check Valve
5	3	Adjustment - Up Stop
6	3	Adjustment - Down Acceleration
7	7F	Flange - Down Valve
	FO	0-Ring - Flange
	7O	0-Ring - Adjustment
	7E	Adjustment - Down Valve
	UO	0-Ring - Down Valve
	XO	Seal - Down Valve
	X	Down Valve
	XD	Noise Suppressor
8	F	Main Filter
	8	Adjustment - Down Deceleration
9	EO	0-Ring - Adjustment
	9E	Adjustment - Down Levelling
	9F	Spring - Down Valve
	Y	Down Levelling Valve
H	H	Manual Lowering - Self Closing
	HO	Seal - Manual Lowering
S	SE	Adjustment - Screw
	SM	Hexagonal
	MS	Grub Screw
	SO	0-Ring - Nipple
	SZ	Nipple
	SF	Spring
A+B	SK	Piston
	MM	Nut - Solenoid
C+D	AD	Collar - Solenoid
	M	Coil - Solenoid (indicate voltage)
	AR	Tube - Solenoid 'Up'
	MO	0-Ring - Solenoid
	AN	Needle - 'Up'
	AF	Spring - Solenoid 'Up'
	AH	Seat Housing - 'Up'
	AS	Seat - Solenoid 'Up'
C+D	MM	Nut - Solenoid
	M	Coil - Solenoid (indicate voltage)
	DR	Tube - Solenoid 'Down'
	MO	0-Ring - Solenoid
	DF	Spring - Solenoid 'Down'
	DN	Needle - 'Down'
	DK	Core - Solenoid
	DG	Seat Housing with Screen - 'Down'
C+D	FD	Filter Solenoid
	DS	Seat - Solenoid 'Down'

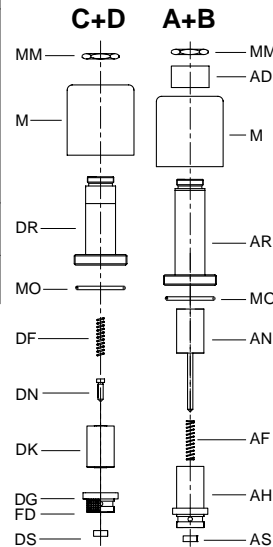
Some parts occur more than once in different positions of the valve.

0-Ring-Size		
No.	3/4"	1 1/2"
FO	26x2P	47x2.5P
EO	9x2P	9x2P
UO	26x2V	39.34x2.62V
WO	5.28x1.78V	5.28x1.78V
VO	23x2.5V	42x3V
7O	5.28x1.78P	9x2P
XO	13x2V	30x3V
HO	5.28x1.78V	5.28x1.78V
SO	5.28x1.78P	5.28x1.78P
MO	26x2P	26x2P

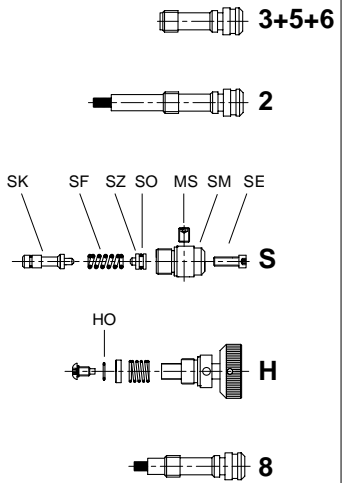
* FO by 4F 2 1/2" is 67x2.5P
** 90 Shore

0-Ring: V - Viton
P - Perbunan

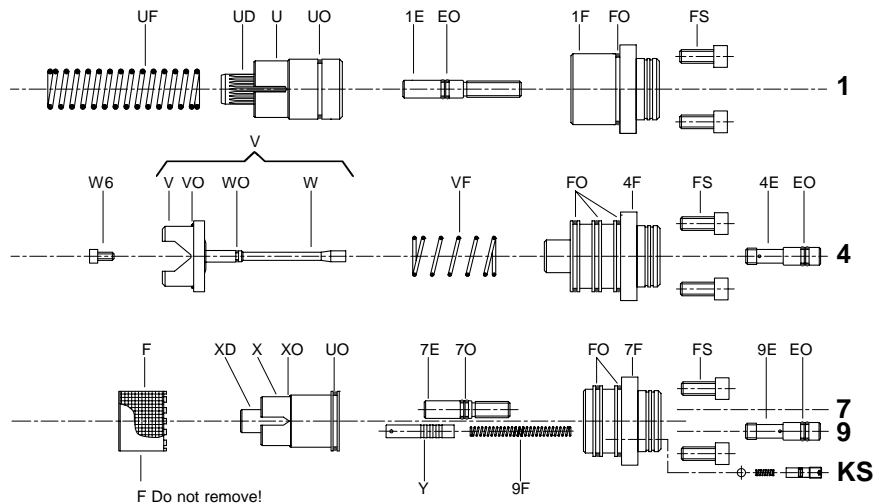
Solenoid Valves



Adjustments

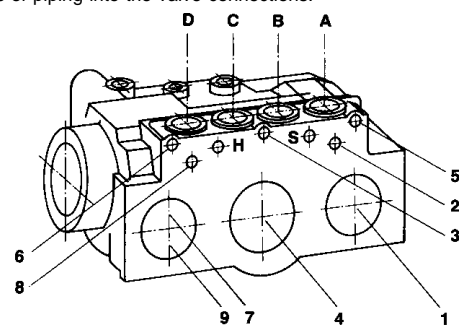
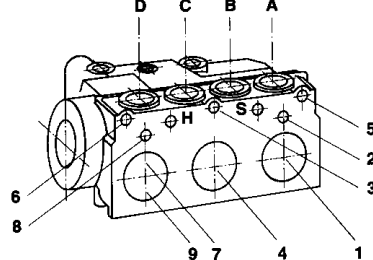
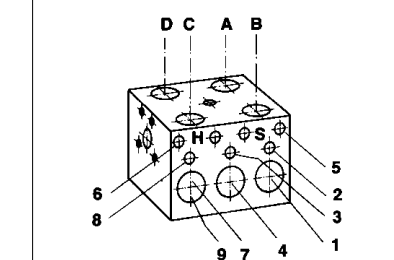


Flow Valves

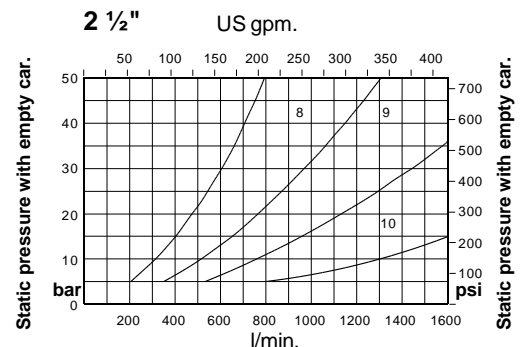
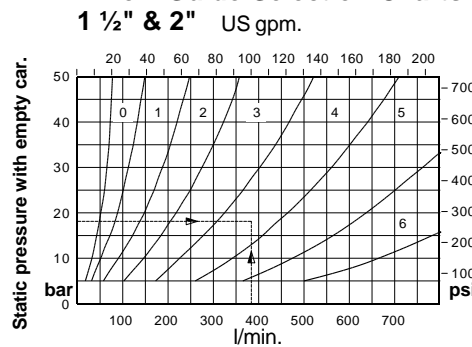
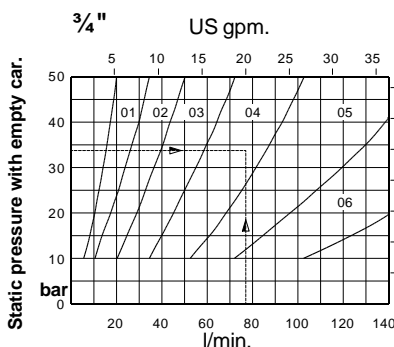


In case of down leakage, replace and test in the following order: DS & DN, XO, VO, WO, FO and HO.

❗ Taper threads: Do not exceed 8 turns of piping into the valve connections.



Flow Guide Selection Charts



To order EV 100, state pump flow, empty car pressure (or flow guide size) and solenoid voltage.

Example order: EV 100, 380lpm, 18 bar (empty), 110 AC ≡ EV 100/4/110AC



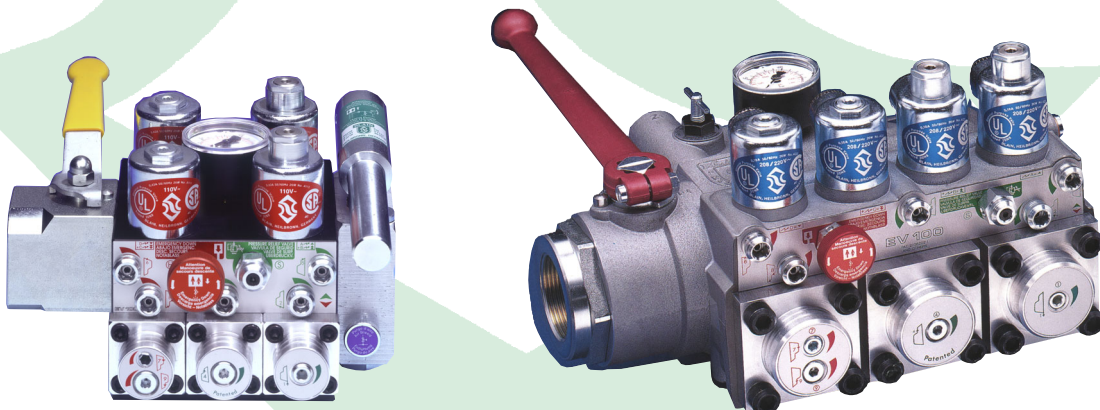


Service Manual

Elevator Valve EV 100

Page

- 1 3/4" Cross Section Diagrams of Valve
- 2 1 1/2" - 2" Section Diagrams of Valve
- 3 + 4 Quick Adjustment Procedure
- 5 EV Parts List
- 6 EV Trouble Shooting, Up Travel
- 7 EV Trouble Shooting, Down Travel
- 8 KS Slack Rope Valve Purpose and Adjustment
- 9 Down Leveling Adj. 9, Replacement
- 10 Overheating of Power Unit. System Leakage
- 11 Switches, Slow Down Distances
- 12 Flow-Pressure-Tables (metric), EV 100 Size Selection
- 13 Flow-Pressure-Tables (USA)



Blain Hydraulics GmbH

Pfaffenstr. 1 • Boellinger Hoefe • D-74078 Heilbronn • Germany
Tel. +49 7131 2821-0 • Fax +49 7131 48 52 16 • www.blain.de • info@blain.de

Manufacturer of the Highest Quality:

Control Valves for Elevators

Tank Heaters - Hand Pumps - Pipe Rupture Valves - Ball Valves



ISO 9001





Caution

Only qualified elevator mechanics are permitted to install and adjust elevator control valves and controllers.

Every Blain control valve is subjected to strong quality standards, from production, adjustment and testing, to final shipment.

This manual will provide assistance whenever servicing is required. If necessary, please contact our technical department, stating the valve number, which is engraved into the EV casting above the nameplate, as well as other related technical data.

Technical Servicing

(from USA)

Dr. F. Celic: Tel. +49 7131 282139 • Tel. 01149 7131 282139

Frank Pausder: Tel. +49 7131 282132 • Tel. 01149 7131 282132

Fax: +49 7131 485216 • Fax 01149 7131 485216

E-Mail: info@blain.de
URL: <http://www.blain.de>

EV 100 Service Manual Elevator Valve - EV 100 $\frac{3}{4}$ " for Home Lifts



Control Elements

- A Solenoid (UP Stop)
- B Solenoid (UP Deceleration)
- C Solenoid (Down Deceleration)
- D Solenoid (Down Stop)
- H Manual Lowering
- S Relief Valve
- U By Pass Valve
- V Check Valve
- W Leveling Valve (Up)
- X Full Speed Valve (Down)
- Y Leveling Valve (Down)

Adjustments UP

- 1 By Pass
- 2 Up Acceleration
- 3 Up Deceleration
- 4 Up Leveling Speed
- 5 Up Stop

Adjustments DOWN

- 6 Down Acceleration
- 7 Down Full Speed
- 8 Down Deceleration
- 9 Down Leveling Speed

- Pressure**
- Pumpe
 - Bypass Valve
 - Up Leveling
 - Tank
 - Cylinder
 - Down Valve
 - Down Leveling



Eléments de commande

- A Electro-vanne 'arrêt' (en fin de montée)
- B Electro-vanne 'ralentissement' (montée)
- C Electro-vanne 'ralentissement' (descente)
- D Electro-vanne 'arrêt' (en fin de descente)
- H Descente de secours (homme mort)
- S Valve de sécurité
- U By-pass
- V Clapet anti-retour
- W Soupape montée petite vitesse
- X Soupape descente
- Y Soupape descente petite vitesse

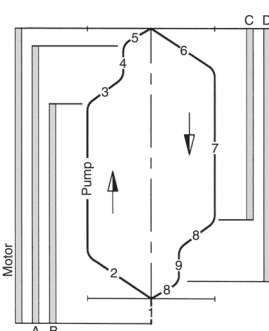
Réglages MONTÉE

- 1 By-pass
- 2 Etrangleur de démarrage
- 3 Etrangleur de ralentissement
- 4 Réglage de petite vitesse
- 5 Etrangleur d'arrêt

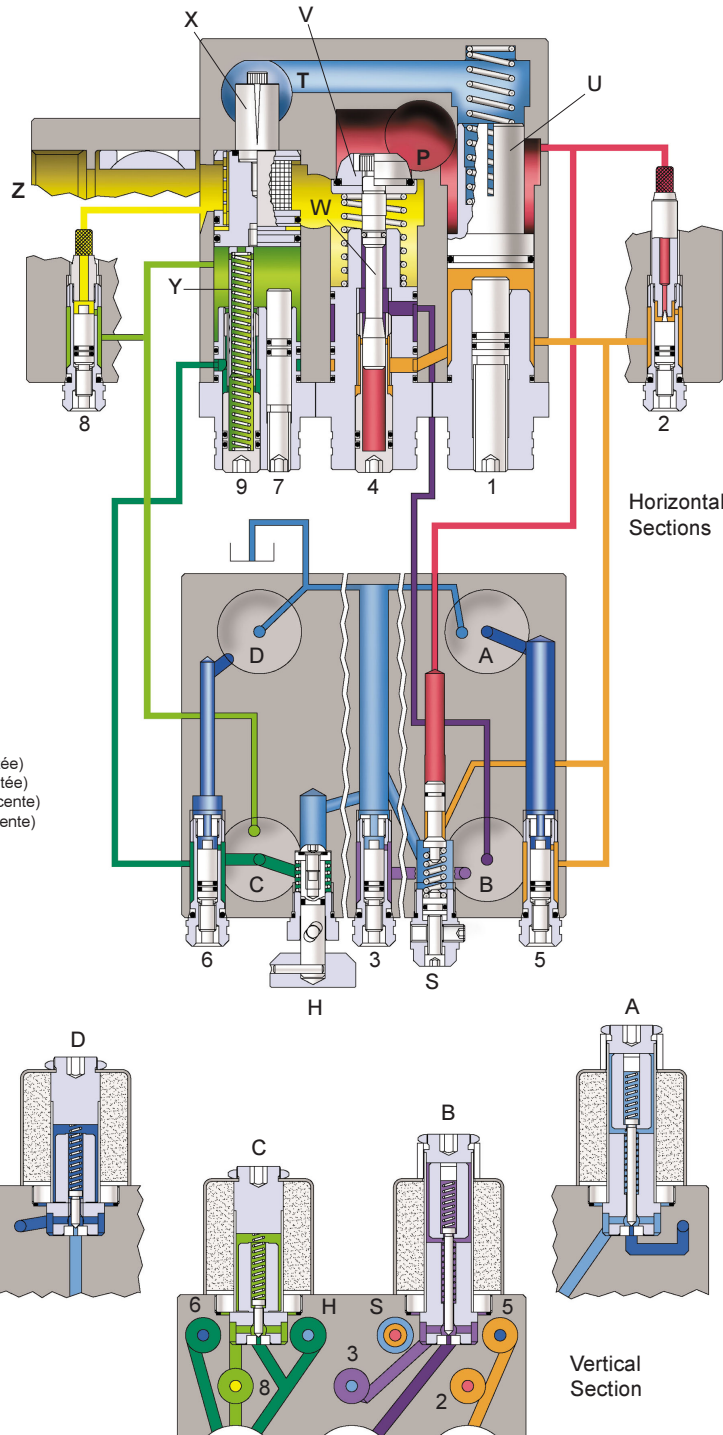
Réglages DESCENTE

- 6 Etrangleur de démarrage
- 7 Réglage de grande vitesse
- 8 Etrangleur de ralentissement
- 9 Réglage de petite vitesse

- Pression**
- Pompe
 - By-pass
 - Montée petit vitesse
 - Cuve
 - Vérin
 - Soupape descente
 - Descente petite vitesse

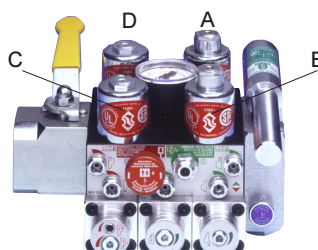


P Pump Port
T Tank Port
Z Cylinder Port



Horizontal Sections

Vertical Section



Steuerelemente

- A Magnetventil (Halt oben)
- B Magnetventil (Abbremsen auf)
- C Magnetventil (Abbremsen unten)
- D Magnetventil (Halt unten)
- H Notablassventil
- S Überdruckventil
- U Umlaufkolben
- V Rückschlagventil
- W Schleichfahrventil (auf)
- X Senkkolben
- Y Schleichfahrventil (ab)

Einstellungen AUF

- 1 Umlaufeinstellung
- 2 Anfahrdschloss
- 3 Abbremsdschloss
- 4 Schleichfahreinstellung
- 5 Haltesdschloss

Einstellungen AB

- 6 Anfahrdschloss
- 7 Senkfahreinstellung
- 8 Abbremsdschloss
- 9 Schleichfahreinstellung

- Druck**
- Pumpe
 - Umlaufkolben
 - Schleichfahrt (Auf)
 - Tank
 - Zylinder
 - Senkkolben
 - Schleichfahrt (Ab)



Elementos de mando

- A Válv. magnética 'parada' (arriba)
- B Válv. magnética 'frenado' (subida)
- C Válv. magnética 'frenado' (bajada)
- D Válv. magnética 'parada' (abajo)
- H Válv. parada de urgencia (manual)
- S Válv. de seguridad
- U Válv. de desviación
- V Válv. de retención
- W Válv. de subida lentísima
- X Válv. de bajada
- Y Válv. de bajada lentísima

Ajustes SUBIDA

- 1 Desviación
- 2 Arranque
- 3 Frenado
- 4 Recorrido lentísimo
- 5 Parada

Ajustes BAJADA

- 6 Arranque
- 7 Recorrido en bajada
- 8 Frenado
- 9 Recorrido lentísimo

- Presión**
- Bomba
 - Válvula de desviación
 - Subida lentísima
 - Tanque
 - Cilindro
 - Válvula de bajada
 - Bajada lentísima

Elevator Valve

EV 100 1 1/2", 2", 2 1/2"

**Control Elements**

- A Solenoid (UP Stop)
- B Solenoid (UP Deceleration)
- C Solenoid (Down Deceleration)
- D Solenoid (Down Stop)
- H Manual Lowering
- S Relief Valve
- U By Pass Valve
- V Check Valve
- W Leveling Valve (Up)
- X Full Speed Valve (Down)
- Y Leveling Valve (Down)

Adjustments UP

- 1 By Pass
- 2 Up Acceleration
- 3 Up Deceleration
- 4 Up Leveling Speed
- 5 Up Stop

Adjustments DOWN

- 6 Down Acceleration
- 7 Down Full Speed
- 8 Down Deceleration
- 9 Down Leveling Speed

- Pressure**
- Pumpe
 - Bypass Valve
 - Up Leveling
 - Tank
 - Cylinder
 - Down Valve
 - Down Leveling

**Eléments de commande**

- A Electro-vanne 'arrêt' (en fin de montée)
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- C Electro-vanne 'ralentissement' (descente)
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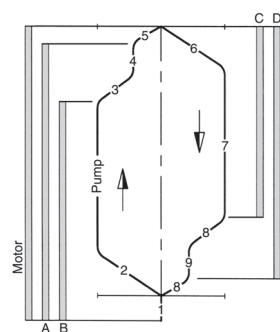
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- 4 Réglage de petite vitesse
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- Pompe
 - By-pass
 - Montée petit vitesse
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 - Vérin
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P Pump Port
T Tank Port
Z Cylinder Port

**Steuerelemente**

- A Magnetventil (Halt oben)
- B Magnetventil (Abbremsen auf)
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- U Umlaufkolben
- V Rückschlagventil
- W Schleichfahrventil (auf)
- X Senkkolben
- Y Schleichfahrventil (ab)

Einstellungen AUF

- 1 Umlaufeinstellung
- 2 Anfahrtdrossel
- 3 Abbremsdrossel
- 4 Schleichfahreinstellung
- 5 Halte-drossel

Einstellungen AB

- 6 Anfahrtdrossel
- 7 Senkfahreinstellung
- 8 Abbremsdrossel
- 9 Schleichfahreinstellung

- Druck**
- Pumpe
 - Umlaufkolben
 - Schleichfahrt (Auf)
 - Tank
 - Zylinder
 - Senkkolben
 - Schleichfahrt (Ab)

**Horizontal Sections****Elementos de mando**

- A Válv. magnética 'parada' (arriba)
- B Válv. magnética 'frenado' (subida)
- C Válv. magnética 'frenado' (bajada)
- D Válv. magnética 'parada' (abajo)
- H Válv. parada de urgencia (manual)
- S Válv. de seguridad
- U Válv. de desviación
- V Válv. de retención
- W Válv. de subida lentísima
- X Válv. de bajada
- Y Válv. de bajada lentísima

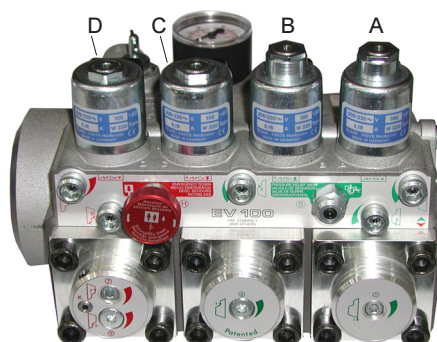
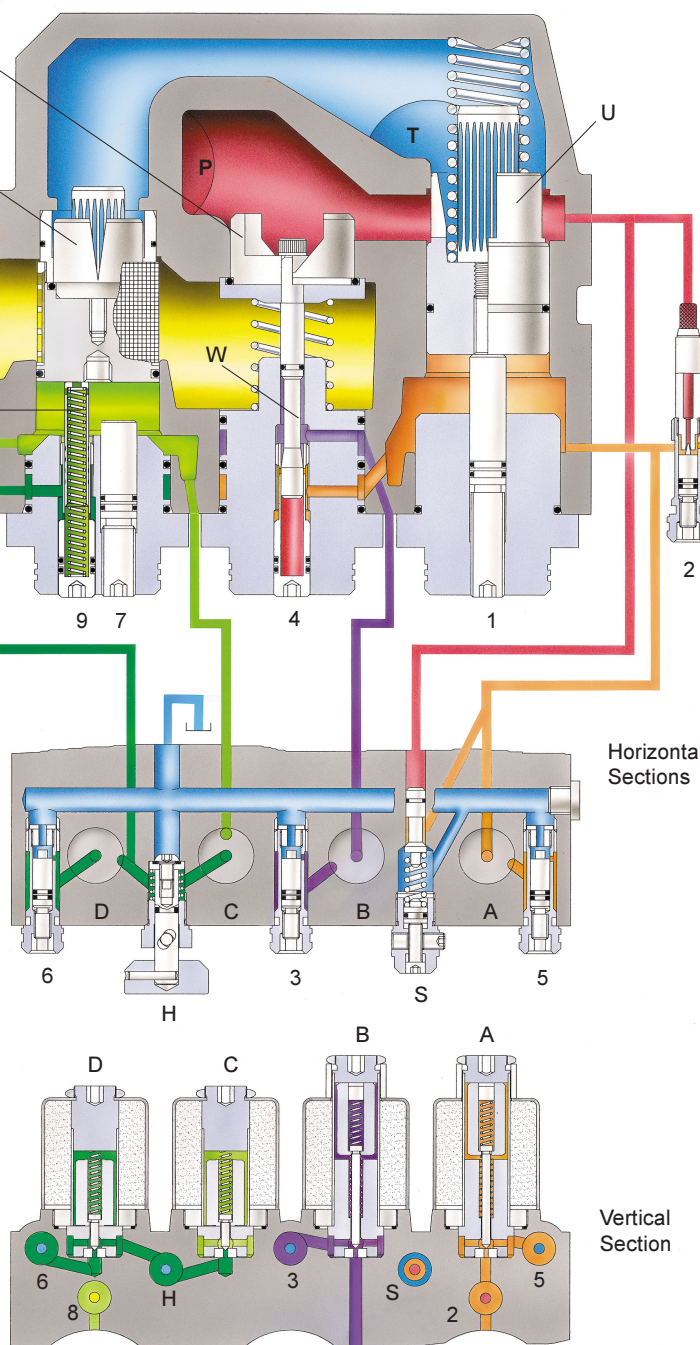
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- 4 Recorrido lentísimo
- 5 Parada

Ajustes BAJADA

- 6 Arranque
- 7 Recorrido en bajada
- 8 Frenado
- 9 Recorrido lentísimo

- Presión**
- Bomba
 - Válvula de desviación
 - Subida lentísima
 - Tanque
 - Cilindro
 - Válvula de bajada
 - Bajada lentísima



Solenoid Coils

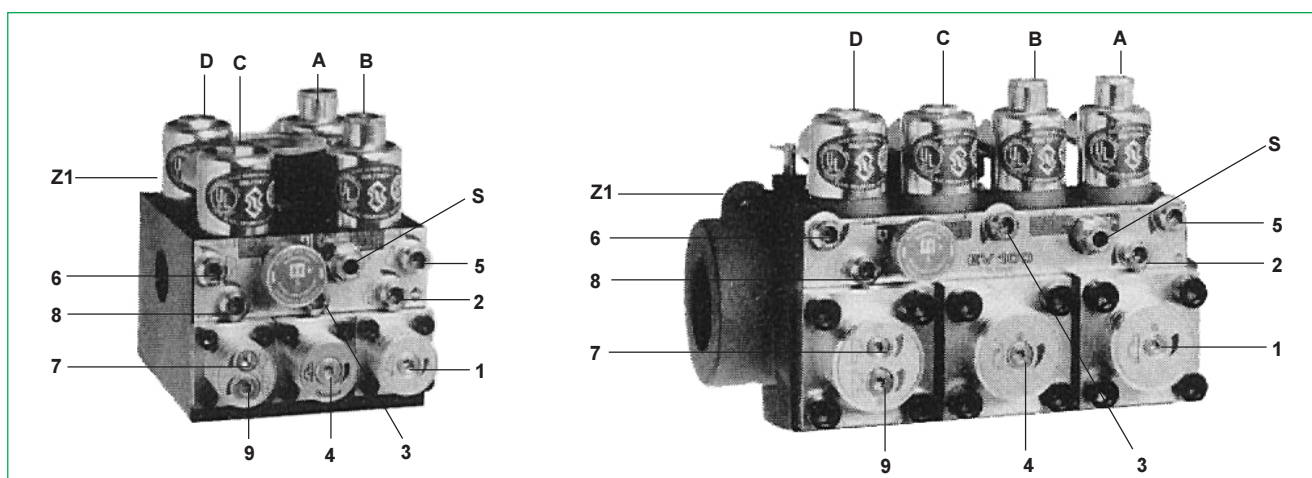
During adjustment of the EV 100 valve, instead of making a full floor to floor travel to check operation, much time can be saved by removing the securing nuts of the coil and switching to deceleration or to acceleration by lifting or replacing the appropriate coil by hand, allowing several adjustment corrections during one car travel between floors.

Caution: Once removed from the solenoid tube, the energised coil will begin to overheat after about 20 secs. If necessary, to slow the rate of heating, place an 8 or 10 mm socket key or similar steel rod as core thru the coil. Do not lay an energised coil to one side, otherwise it may overheat unnoticed.

If the coil becomes too hot to hold, it must be replaced, back over the solenoid tube and any further adjustment carried out with the elevator making normal floor to floor runs.

Car not visible from Machineroom

If the car cannot be seen during adjustment of the valve, the acceleration and deceleration times can be heard from the change of the turbulent noise within the valve as the speed of the car changes. With no load in the car, the duration of the speed changes should be about 2,5 seconds. This applies to adjustments 2, 3, 6 and 8.



Up Travel (empty car)

PRE-SETTINGS

Adjustment No. 1	level with flange face.	5 mm Socket key
Adjustment No. 2	all the way 'in' then 2 turns 'out'.	3 mm " "
Adjustment No. 3	" " " " " 4 " "	3 mm " "
Adjustment No. 4	level with flange face.	5 mm " "
Adjustment No. 5	all the way 'in' then 4 turns 'out'.	3 mm " "
Adjustment No. S	" " " " " 2 " "	3 mm " "

1. Pilot Pressure Setting

Disconnect coil **A**. Energise Motor (pump).

If the car does not move, turn No. 1 'in' until the car begins to move, turn No. 1 'out' until the car stops, then back out again 1/2 turn. The car remains standing still.

DO NOT UP-LEVEL WITH THIS ADJUSTMENT! Between full and empty car, leveling speed differences would be extreme.

2. Up Acceleration

Reconnect coil **A**. Start Motor and energise coil **A** and **B** (normal 'up' call).

Observe the up acceleration. If it is too quick, turn No. 2 'in' 1/2 turn. If it is too long, turn No. 2 'out' 1/2 turn.

Repeat until acceleration is satisfactory. Acceleration time should be about 2,5 secs.

4. Up Leveling

Disconnect coil **B**. Energise Motor and coil **A** (normal 'up-level' call).

With adjustment No. 4 level with the face of the flange the car will up level. If the leveling speed is too fast, turn No. 4 'in' until the speed is as required. If the speed is too slow, turn No. 4 'out'. Recommended speed 6 cm/sec.

3. Up Deceleration

With coil **B** still disconnected. Energise motor and coil **A** (normal 'up-level' call).

The car will travel upwards at leveling speed. Turn No. **3** 'in' until the car starts to up level faster, then turn No. **3** 'out' until the original leveling speed is observed. Reconnect coil **B** and place a normal up call. Observe the deceleration of the car. If it is too long, turn No. **3** 'out' ¼ turn; if it is too short, turn No. **3** 'in' ¼ turn. Repeat until deceleration is satisfactory. Deceleration time should be about 2,5 secs.

5. Up Soft Stop

Disconnect coil **A**. Energise Motor.

The car should not move. Turn No. **5** 'in' until the car starts upwards then turn No. **5** 'out' until the car stops. Reconnect coil **A**. Energise Pump-Motor and **A**. The car will travel upwards at leveling speed.

Lift **A** coil by hand briefly and observe the stopping of the car. If the stop is too hard turn No. **5** 'in' ¼ turn. If the stop is too soft, turn No. **5** 'out', ¼ turn. Repeat until the stop is satisfactory.

S Pressure Relief Valve

Turn **S** screw 'out' until about 2 mm of the screw head is showing. Close the ball valve in the cylinder line and open the manual lowering **H** to lower valve pressure down to zero. Place an up call, energising motor and coils **A** and **B**. The relief pressure will show on the pressure gauge.

To increase the relief valve setting, turn **S** 'in'.

To decrease the relief valve setting, turn **S** 'out', then open the manual lowering for ½ second with the pump still running to release locked-in pressure, before observing the pressure gauge reading.

Down Travel (empty car)

PRE-SETTINGS

Adjustment No. 6	all the way 'in' then 4 turns 'out'.	3 mm Socket key
Adjustment No. 7	3 mm under the flange face.	5 mm " "
Adjustment No. 8	all the way 'in' then 2 turns 'out'.	3 mm " "
Adjustment No. 9	level with flange face.	5 mm " "

8. Down Deceleration

Place down call (coils **C** and **D** energised).

As the car approaches full speed, remove coil **D** by hand briefly from the solenoid and observe the deceleration of the car. If the deceleration is too long, turn No. **8** 'out' ¼ turn; if it is too short, turn No. **8** 'in' ¼ turn.

Repeat until deceleration is satisfactory. Deceleration time should be about 2,5 secs.

6. Down Acceleration

Turn No. **6** all the way 'in'. Place down call (coils **C** and **D** energised).

The car will not move. Turn No. **6** 'out' slowly until the car accelerates downwards.

If the acceleration is too long, turn No. **6** 'out' ¼ turn. If it is too short, turn No. **6** 'in' ¼ turn.

Acceleration time should be about 2,5 secs.

7. Down Full Speed

Place down call (coils **C** and **D** energised).

Observe full down speed. Turn No. **7** 'in' for slower, 'out' for faster speed.

9. Down Leveling Speed

Disconnect coil **C**. Place down call (**D** energised).

Observe down leveling speed. Turn No. **9** 'in' for slower, 'out' for a fast down leveling speed.

Recommended speed 6 cm/sec.

H Emergency Lowering

The manually operated emergency down speed and the **D** coil operated down leveling speed are the same.

Down Stop

When solenoid **D** is de-energised with solenoid **C** remaining de-energised, the car will stop according to the setting of adjustment 8 and no further adjustment will be required.

KS Slack Rope Valve

The KS is adjusted with a 3 mm Socket Key by turning the screw **K** 'in' for higher pressure and 'out' for lower pressure. With **K** turned all the way 'in', then half a turn back out, the unloaded car should descend when the **D** solenoid alone is energised. Should the car not descend, **K** must be backed off until the car just begins to descend, then backed off a further half turn to ensure that with cold oil, the car can be lowered as required.

Pos.	No.	Item
1	FS	Lock Screw - Flange
	FO	0-Ring - Flange
	1F	Flange - By Pass
	EO	0-Ring - Adjustment
	1E	Adjustment - By Pass
	UO	0-Ring - By Pass Valve
	U	By Pass Valve
2	UD	Noise Suppressor
	UF	Spring - By Pass
3	2	Adjustment - Up Acceleration
3	3	Adjustment - Up Deceleration
4	EO	0-Ring - Adjustment
	4E	Adjustment - Up Leveling
	4F	Flange - Check Valve
	FO	0-Ring - Flange
	VF	Spring - Check Valve
	W	Up-Leveling Valve
	WO	0-Ring - Up Leveling Valve
	VO	Seal - Check Valve
	V	Check Valve
	W6	Screw - Check Valve
5	3	Adjustment - Up Stop
6	3	Adjustment - Down Acceleration
7	7F	Flange - Down Valve
	FO	0-Ring - Flange
	7O	0-Ring - Adjustment
	7E	Adjustment - Down Valve
	UO	0-Ring - Down Valve
	XO	Seal - Down Valve
	X	Down Valve
8	XD	Noise Suppressor
	F	Main Filter
8	8	Adjustment - Down Deceleration
9	EO	0-Ring - Adjustment
	9E	Adjustment - Down Leveling
	9F	Spring - Down Valve
	Y	Down Leveling Valve
H	H	Manual Lowering - Self Closing
	HO	Seal - Manual Lowering
S	SE	Adjustment - Screw
	SM	Hexagonal
	MS	Grub Screw
	SO	0-Ring - Nipple
	SZ	Nipple
	SF	Spring
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A+B	MM	Nut - Solenoid
	AD	Collar - Solenoid
	M	Coil - Solenoid (indicate voltage)
	AR	Tube - Solenoid 'Up'
	MO	0-Ring - Solenoid
	AN	Needle - 'Up'
	AF	Spring - Solenoid 'Up'
C+D	AH	Seat Housing - 'Up'
	AS	Seat - Solenoid 'Up'
	MM	Nut - Solenoid
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	MO	0-Ring - Solenoid
	DF	Spring - Solenoid 'Down'
C+D	DN	Needle - 'Down'
	DK	Core - Solenoid
	DG	Seat Housing with Screen - 'Down'
	FD	Filter Solenoid
	DS	Seat - Solenoid 'Down'
	DS	Seat - Solenoid 'Down'
Some parts occur more than once in different positions of the valve.		

0-Ring-Size			
No.	3/4"	1 1/2"	2 1/2"
FO	26x2P	47x2.5P	58x3P *
EO	9x2P	9x2P	9x2P
UO	26x2V	39.34x2.62V	58x3V
WO	5.28x1.78V	5.28x1.78V	5.28x1.78V
VO	23x2.5V	42x3V	60x3V **
7O	5.28x1.78P	9x2P	9x2P
XO	13x2V	30x3V	47x3V
HO	5.28x1.78V	5.28x1.78V	5.28x1.78V
SO	5.28x1.78P	5.28x1.78P	5.28x1.78P
MO	26x2P	26x2P	26x2P

* FO by 4F 2 1/2" is 67x2.5P

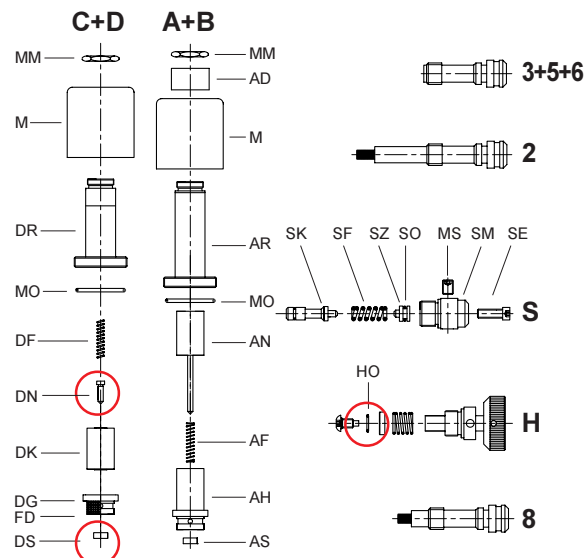
** 90 Shore

0-Ring: V - Viton

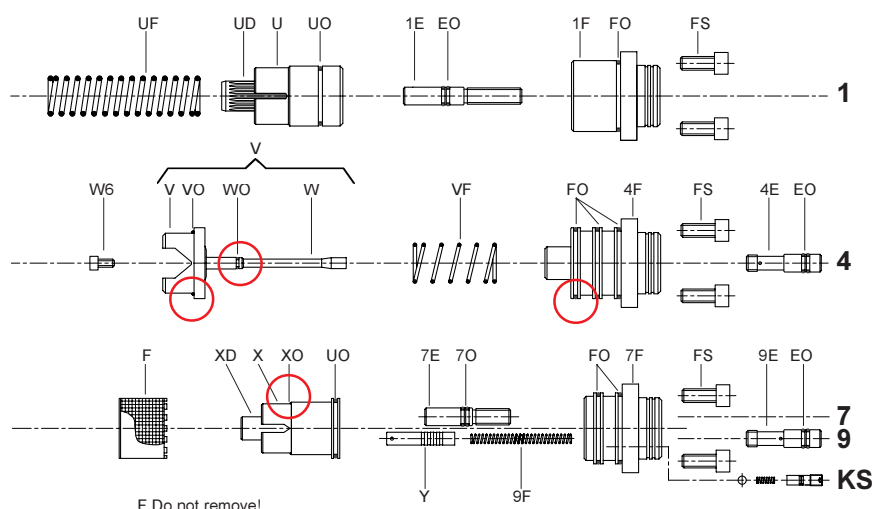
P - Perbunan

Solenoid Valves

Adjustments



Flow Valves

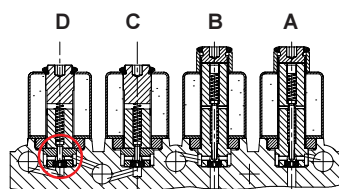


F Do not remove!

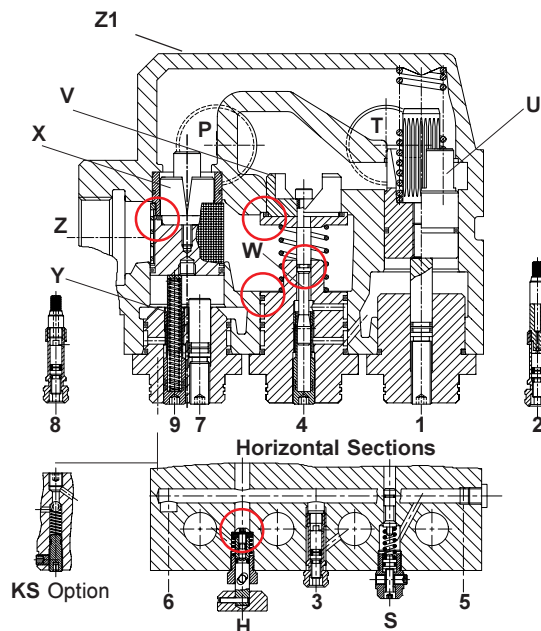
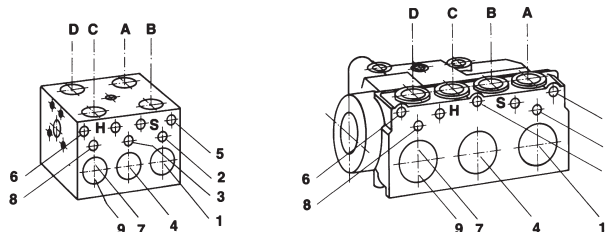
Down Leakage (Releveling)

In case of down leakage, replace and test in the following order: DS & DN, XO, VO, WO, FO and HO.

EV 100 1 1/2", 2", 2 1/2"



Vertical Section



- ① For checking the operation of the solenoids, remove the top nuts. By lifting the solenoids a few millimeters, the magnetic pull of the solenoid can be felt. For testing, the operation of the elevator car, can also be controlled by lifting and replacing the coil.

Valves are fully adjusted and tested in the factory. Check electrical operation before changing valve setting.

Problem	Possible cause	Recommended
No Up-Start (Elevator remains at floor)	Test: Turn adjustment 5 all the way in. If the elevator now starts upwards the problem is at solenoid A.	
	Solenoid A not energised or voltage too low.	Lift coil to check magnetic pull (see ① above).
	Solenoid A tube not screwed down tight.	Tighten Solenoid A tube.
	Solenoid valve A - dirt or damage between needle AN and seat AS.	Clean or change needle and seat.
	Adjustment 2 not far enough open.	Turn out adjustment 2.
	Adjustment 1 too far back (open). Not enough pilot pressure.	Turn in adjustment 1 with the pump running.
	Relief valve is set too low.	Set relief valve higher.
	Adjustment 8 turned in too far (car sits on the buffer).	Turn out adjustment 8.
	Bypass flow guide is too large.	Insert smaller bypass flow guide (see flow guide charts at EV catalogue).
	Pump running in the wrong direction.	Install the pump correct.
	The pump connection flange is leaking excessively.	Seal the pump connection.
	The pump is undersize or worn.	Select bigger pump or replace pump.
Up-Start, but no Full Speed	Test: If by turning adjustment 1 with the pump running the pressure does not rise above 5 bar, even with a smaller bypass valve inserted, the problem should be sought at the pump.	
	Test: Turn adjustment 3 all the way in. If the elevator now travels upwards at full speed the problem is at solenoid B.	
	Solenoid B not energised or voltage too low.	Lift coil to check magnetic pull (see ① above).
	Solenoid B tube not screwed down tight.	Tighten Solenoid B tube.
	Solenoid valve B - dirt or damage between needle AN and seat AS.	Clean or change needle and seat.
	The pump connection flange is leaking excessively.	Seal the pump connection.
Up-Start too hard	The pump is undersize or worn.	Select bigger pump or replace pump.
	Test: If by turning adjustment 1 with the pump running the pressure does not rise above 5 bar, even with a smaller bypass valve inserted, the problem should be sought at the pump.	
	Adjustment 1 turned in too far.	Turn out adjustment 1.
	Adjustment 2 turned out too far.	Turn in adjustment 2.
	O-Ring UO on Bypass Valve U is leaking.	Change O-Ring → see EV Spare Parts List.
No deceleration into leveling speed	Star to Delta motor switch period is too long.	0.2-0.3 sec. is sufficient.
	Excessive friction on the guide rails or in the cylinder head.	Can not be eliminated thru valve adjustment.
	Solenoid B does not de-energise.	Lift coil to check magnetic pull (see ① above). Slow down switch possibly set to high (late).
Aufzug brems ab, fährt jedoch über die Halte- stelle	Adjustment 3 turned in too far.	Turn out adjustment 3. Turn in adjustment 2.
	O-Ring UO on Bypass Valve U is leaking.	Change O-Ring → see EV Spare Parts List.
	Magnetventil A (Halt oben) zu spät stromlos.	Magnetspule anheben (siehe Vermerk ②).
	Drossel 5 (Weich-Halt) nicht weit genug geöffnet.	Drossel 5 weiter aufdrehen.
Aufzug bleibt vor der Haltstelle stehen (keine Schleichfahrt)	Einstellung 1 nicht weit genug geöffnet.	Einstellung 1 zwei Umdrehungen weiter öffnen.
	Schleichfahrt aufwärts zu schnell (zu weit geöffnet).	Einstellung 4 auf 6 - 10 cm/sek. hineindrehen
	Solenoid A and B reversed.	Lift coil to check magnetic pull (see ① above).
	Up leveling speed too slow.	Turn out adjustment 4.
Down Leak Releveling	Middle O-Ring FO of flange 4F is leaking.	Change O-Ring → see EV Spare Parts List.
	Relief valve is set too low.	Set relief valve higher.
	For possible down leakage points, see 'EV Parts List', page 5. Releveling may also occur as hot oil cools down and contracts.	Replace one seal point and test before proceeding to the next point of possible leakage, if still necessary.

- ① For checking the operation of the solenoids, remove the top nuts. By lifting the solenoids a few millimeters, the magnetic pull of the solenoid can be felt. For testing, the operation of the elevator car, can also be controlled by lifting and replacing the coil.

Valves are fully adjusted and tested in the factory. Check electrical operation before changing valve setting.

Problem	Possible cause	Recommended
No Down Start	Solenoid D not energised or voltage too low.	Lift coil to check magnetic pull (see ① above).
	Adjustment 6 turned in too far.	Turn out adjustment 6 .
	Adjustment 8 turned out too far.	Turn in adjustment 8 cautiously. Attention: Danger of traveling through
	O-Ring UO on Down Valve X is leaking.	Change O-Ring → see EV Spare Parts List.
No full speed	Solenoid C not energised or voltage too low.	Lift coil to check magnetic pull (see ① above).
	Adjustment 7 turned in too far.	Turn out adjustment 6 .
	Down Valve flow guide too small.	Check insert size (see flow guide charts page 12)
No down leveling. Elevator stops before floor level	Solenoid C and D reversed.	Lift coil to check magnetic pull (see ① above).
	Solenoid D not energised or voltage too low.	Lift coil to check magnetic pull (see ① above).
	Adjustment 9 turned in too far.	Turn out adjustment 9 to about 10 ft/min. leveling speed.
	Spring 9F in adjustment 9 broken.	Replace adjustment 9 complete.
No down leveling. Elevator travels thru floor level	Adjustment 8 turned in too far.	Turn out adjustment 8 about ½ turn.
	Adjustment 9 turned out too far.	Turn in adjustment 9 to about 10 ft/min. leveling speed.
	Solenoid valve C dirt or damage between needle DN and seat DS .	Clean or change needle and seat.
	Inner O-Ring FO on flange 7F is leaking.	Change O-Ring → see EV Spare Parts List.
Elevator sinks quickly	Solenoid D tube not screwed down tight.	Tighten Solenoid D tube.
	Adjustment 8 turned in too far.	Turn out adjustment 8 about ½ turn.
Elevator sinks slowly due to inner leakage	Solenoid valve D - dirt or damage between needle DN and seat DS .	Clean or change needle and seat.
	O-Ring XO of Down Valve X is leaking.	Change O-Ring → see EV Spare Parts List. When Down Valve is compensated, replace Down Valve.
	O-Ring VO of Check Valve V is leaking.	Change Check Valve → see EV Spare Parts List.
	O-Ring WO of Leveling Valve W is leaking.	Change O-Ring → see EV Spare Parts List.
	Inner O-Ring FO on flange 4F is leaking.	Change O-Ring → see EV Spare Parts List.
	O-Ring HO of Manual Lowering H is leaking.	Replace Manual Lowering.
	Handpump leaking.	Remove suction tube and observe if handpump leaks. Replace complete handpump.
	Adjustment 8M turned in too far.	Turn out adjustment 8 .
	Down valve HX/MX leaking. At MX - dirt or damage between needle DN and seat DS .	Clean or change needle and seat.
	O-Ring XO of Down Valve YM is leaking.	Change O-Ring → see EV Spare Parts List.
	Manual Lowering is leaking.	Replace Manual Lowering.
	Contraction of oil during cooling especially from above 35°C.	Consider oil cooler if hot oil is a problem.

Purpose

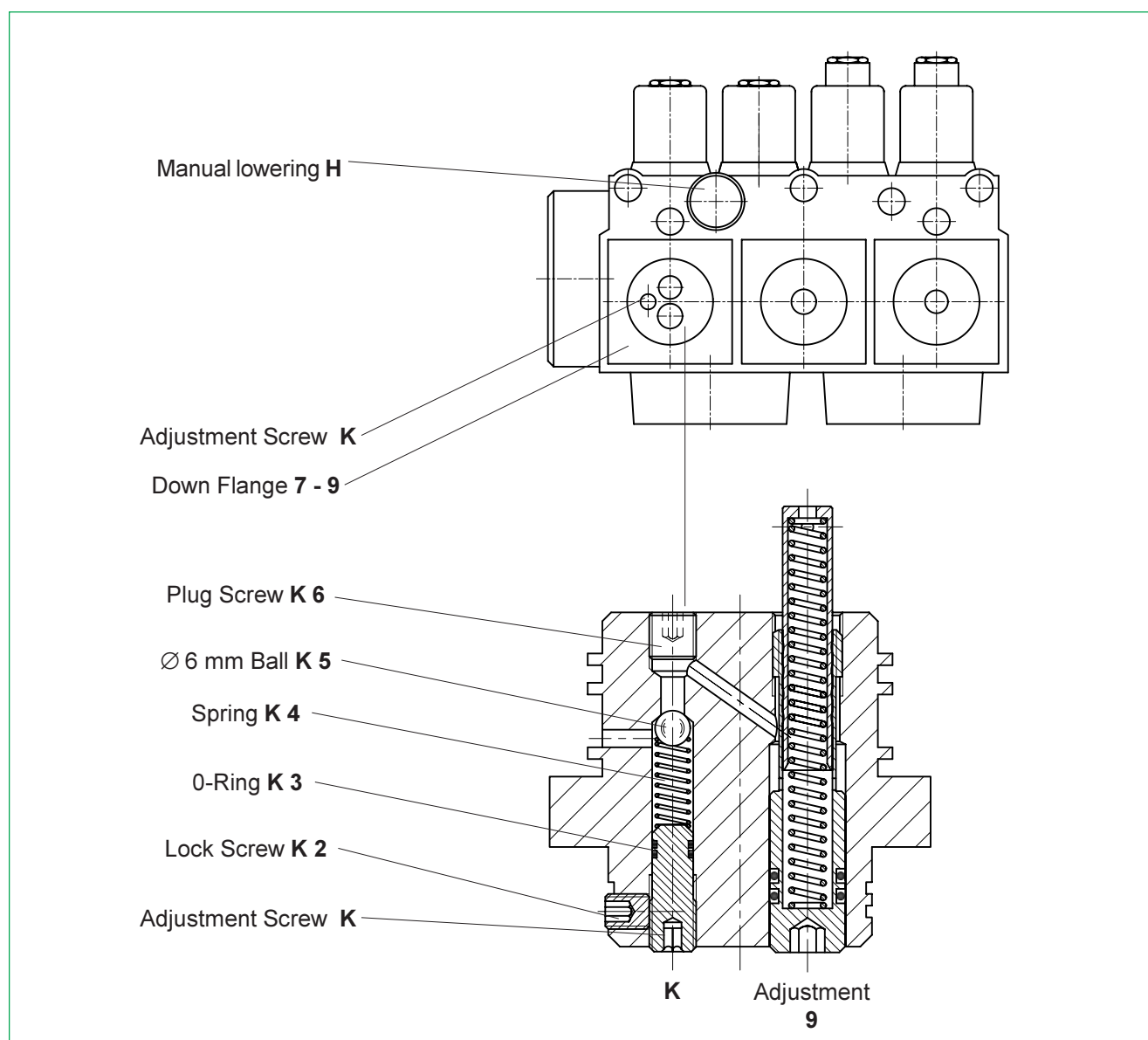
In the case of the operation of the safeties in a 1:2 hydraulic lift system when the weight of the car is no longer carried by the ropes, the electrical supply to the elevator must automatically be switched off. The **K** Slack Rope Valve avoids the ram being lowered by the opening of the manual lowering valve which could otherwise cause a tangled rope condition. The **K** Slack Rope Valve prevents the pressure holding up the ram from being evacuated through the manual lowering valve.

Function

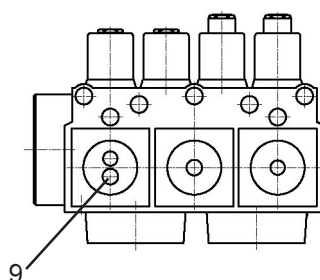
The **K** valve is adjusted to a pressure just above the pressure produced by the weight of the ram. When under normal operating conditions, the weight of the car acts upon the ram through the 1:2 roping, the resulting pressure is sufficient to open the poppet of the **K** valve when the manual lowering **H** is opened, allowing the car to descend as required. When however the 'safeties' have operated and only the weight of the ram and sheave block are acting upon the hydraulic system, the resulting pressure is too low to open the **K** valve. The ram and sheave block can not be lowered.

Adjustment

The **K** is adjusted with a 3 mm Socket Key by turning the screw **K** 'in' for higher pressure and 'out' for lower pressure. With **K** turned all the way 'in', then half a turn back out, the unloaded car should descend when the **D** solenoid alone is energised. Should the car not descend, **K** must be backed off until the car just begins to descend, then backed off a further half turn to ensure that with cold oil, the car can be lowered as required.



Down Leveling Adjustment 9 Replacement



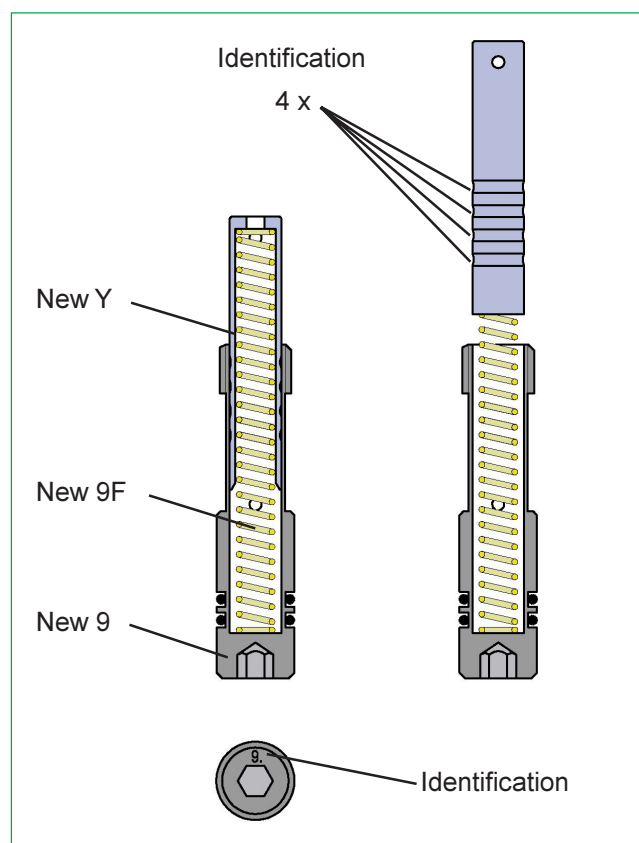
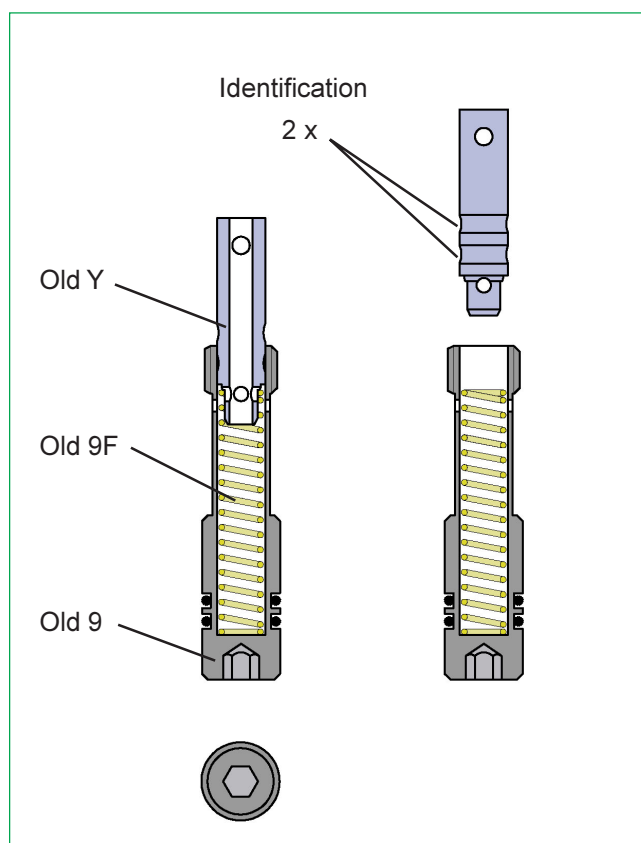
Old Type

1971 - 1999

Replacement not necessary
if operation is normal

New Type

from Jan. 2000



Advantages of new type

- Smoother deceleration
- Higher mechanical closing force
- Longer spring life
- Easier assembly

In the past, a small number of the original springs No. 9F have broken. Beginning January 2000, the design of the down leveling adjustment was modified to take a stronger spring.

The complete new adjustment is interchangeable with the original adjustment 9.

A broken spring 9 would cause the down leveling speed to be slower. No danger to passengers would arise as a consequence.

Oil temperatures above 55 °C (130° F) should be avoided, otherwise the efficiency of the pump drops considerably and its life is reduced. Aging of the oil is also accelerated.

Possible causes of overheating:

1. Up leveling too long due to the leveling speed being too slow or the slow down switch being set too low.
2. Machine room ventilation inadequate.
3. The frequency of operation is too high for the normal rate of heat dissipation.

Temporary solution:

As a temporary measure to avoid overheating of the oil resulting in the shut down of the elevator, the down speed can be slowed to reduce frequency of operation until a permanent solution is installed.

Cooling systems

- a. If the degree of overheating is not excessive and it takes for example two to three hours for the oil temperature to rise from 20° to 55°C (70° to 130° F), it may be sufficient to improve air circulation around the power unit, for example through the installation of a 0.05 to 0.10 kW ventilator extracting air out of the machine room or through a fan of similar power, blowing air over the power unit.
- b. Should the above be inadequate, depending on the size of the elevator, it will be necessary to install a 10-50 l/min (3 - 13 gpm) pump to circulate the hot oil through an air cooled radiator of about 0.1 to 0.2 fan kW. It is also essential that there is sufficient extraction of warm air out of the machine room or that the cooler is out side of the machine room, for example in the elevator shaft. The effective cooling power of an air cooled radiator should not to be confused with the power of the fan drive which normally need only be 0.1 or 0.2 kW. Normally, the effective cooling power of a cooler need only be approximately ¼ of the main hydraulic elevator motor, in the case of submersible drives.

Cooling systems for the above purpose should be switched into operation when the oil reaches 30° - 35°C (85° - 95° F).

System leakage (re-leveling)

The aim of manufacturers of hydraulic elevator control valves is to produce valves with zero leakage. Due to fine contamination in the oil perfect sealing between valve parts may not always be achieved, leading to a slow down leak of the elevator car.

It would become unnecessarily expensive to strive for perfect sealing in every valve in operation. Therefore, because code requirements assure a safe releveleving system whether descent of the car is caused by valve leakage or through the cooling of the oil in the cylinder pressure system, a minor leakage of the control valve can be tolerated.

1. The European Code EN 81-2 require: that the loaded elevator does not leak downwards by more than 10 mm (3/8") in 10 minutes. This is the standard used to determine if a valve should be serviced for leakage.
2. For practical reasons, a quicker method for judging valve leakage is to close the ball valve in the cylinder line and observe the gauge showing pressure in the cylinder chamber of the valve. If this pressure falls to zero in less than 20 secs, it may be necessary to service the valve, depending on the diameter of the main ram and sensitivity of the customer.
3. Down sinking giving the impression of leakage can be due to cooling of the oil.

When the elevator is at rest and the temperature of the oil falls, contraction of the oil in the cylinder and piping causes the car to sink. This sinking is very slow but overnight without releveleving could amount to as much as half a meter, depending on the temperature drop of the oil and the volume of oil in the cylinder system. The elevator releveleving system, operating normally however, keeps the car at floor level.

4. In the case of Blain EV valves, see page 6 indicating where valve down leakage can occur.

Recommended distances between leveling and stop switches

Elevator Speed	Switch Distance	Elevator Speed	Switch Distance
mtrs/sec.	approx. cm	ft/min.	approx. inches
0,10	5	20	2
0,15	10	30	4
0,20	15	40	6
0,25	18	50	7
0,30	25	60	9
0,35	30	70	12
0,40	40	80	16
0,45	46	90	18
0,50	50	100	20
0,55	58	110	23
0,60	70	120	28
0,70	80	140	31
0,80	95	160	36
0,90	105	180	41
1,00	120	200	48

With no load in the car, the deceleration time should be 2 to 2,5 secs. from full speed to leveling speed. The leveling time should be 1 to 2 secs.

Accurate landing can be affected by different factors as follows:

- If the leveling speed is fast i.e. 0,1 m/sec (20 ft/min), landing will not be as accurate as when the leveling speed is slower i.e. 0,05 m/sec (10 ft/min).
- If the soft stop adjustment '5' is set too soft, stopping will be less accurate as when '5' is set for a quicker stop.
- Particularly when the mechanic can not see the operation of the elevator car, it is possible that the elevator has not finished decelerating from fast speed before reaching the floor. In other words, the elevator has not slowed down to its correct leveling speed before the stop switch is actuated.
Usually, the leveling operation can be observed through the crack in the car doors. Alternatively, in the machine room, the turbulent noise within the valve during leveling can be heard and should last 1 to 2 secs. following 2 to 2,5 secs. deceleration time with no load in the car.
- A difference in landing accuracy between the elevator being loaded and unloaded, can be due to the car under load, leaning to one side by several millimeters causing an alteration in the operating position of the stop switch by some centimetres.

Ram Ø

Area

Speed

Flow

Ram Ø

Area

Load

Pressure

Speed-Flow		Geschwindigkeit-Durchfluss							Vitesse -Débit					Velocidad-Caudal				
m/sec.		0,05	0,10	0,15	0,20	0,25	0,30	0,35	0,40	0,45	0,50	0,55	0,60	0,70	0,80	0,90	1,00	
Ø mm	cm²	l/min.																
35	9,6	2,9	5,8	8,7	11,5	14	17	20	23	26	29	32	35	40	46	52	58	
40	12,6	3,8	7,5	11,3	15,1	19	23	26	30	34	38	41	45	53	60	68	75	
45	15,9	4,8	9,5	14,3	19,1	24	29	33	38	43	48	52	57	67	76	86	95	
50	19,6	5,9	11,8	17,7	23,6	29	35	41	47	53	59	65	71	82	94	106	118	
55	23,8	7,1	14,3	21,4	28,5	36	43	50	57	64	71	78	86	100	114	128	143	
60	28,3	8,5	17,0	25,4	33,9	42	51	59	68	76	85	93	102	119	136	153	170	
65	33,2	10,0	19,9	29,9	39,8	50	60	70	80	90	100	110	119	139	159	179	199	
70	38,5	11,5	23,1	34,6	46,2	58	69	81	92	104	115	127	139	162	185	208	231	
75	44,2	13,3	26,5	39,8	53,0	66	80	93	106	119	133	146	159	186	212	239	265	
80	50,3	15,1	30,2	45,2	60,3	75	90	106	121	136	151	166	181	211	241	271	302	
85	56,7	17,0	34,0	51,1	68,1	85	102	119	136	153	170	187	204	238	272	306	340	
90	63,6	19,1	38,2	57,3	76,3	95	115	134	153	172	191	210	229	267	305	344	382	
95	70,9	21,3	42,5	63,8	85,1	106	128	149	170	191	213	234	255	298	340	383	425	
100	78,5	23,6	47,1	70,7	94,2	118	141	165	188	212	236	259	283	330	377	424	471	
105	86,6	26,0	52,0	77,9	103,9	130	156	182	208	234	260	286	312	364	416	468	520	
110	95,0	28,5	57,0	85,5	114,0	143	171	200	228	257	285	314	342	399	456	513	570	
115	103,9	31,2	62,3	93,5	124,6	156	187	218	249	280	312	343	374	436	499	561	623	
120	113,1	33,9	67,9	101,8	135,7	170	204	238	271	305	339	373	407	475	543	611	679	
125	122,7	36,8	73,6	110,4	147,3	184	221	258	295	331	368	405	442	515	589	663	736	
130	132,7	39,8	79,6	119,5	159,3	199	239	279	319	358	398	438	478	557	637	717	796	
140	153,9	46,2	92,4	138,5	184,7	231	277	323	369	416	462	508	554	647	739	831	924	
150	176,7	53,0	106,0	159,0	212,1	265	318	371	424	477	530	583	636	742	848	954	1060	
160	201,1	60,3	120,6	181,0	241,3	302	362	422	483	543	603	664	724	844	965	1086	1206	
170	227,0	68,1	136,2	204,3	272,4	340	409	477	545	613	681	749	817	953	1090	1226	1362	
180	254,5	76,3	152,7	229,0	305,4	382	458	534	611	687	763	840	916	1069	1221	1374	1527	
190	283,5	85,1	170,1	255,2	340,2	425	510	595	680	766	851	936	1021	1191	1361	1531	1701	
200	314,2	94,2	188,5	282,7	377,0	471	565	660	754	848	942	1037	1131	1319	1508	1696	1885	
210	346,4	103,9	207,8	311,7	415,6	520	623	727	831	935	1039	1143	1247	1455	1663	1870	2078	
220	380,1	114,0	228,1	342,1	456,2	570	684	798	912	1026	1140	1254	1368	1597	1825	2053	2281	
240	452,4	135,7	271,4	407,2	542,9	679	814	950	1086	1221	1357	1493	1629	1900	2171	2443	2714	
260	530,9	159,3	318,6	477,8	637,1	796	956	1115	1274	1434	1593	1752	1911	2230	2548	2867	3186	
280	615,8	184,7	369,5	554,2	738,9	924	1108	1293	1478	1663	1847	2032	2217	2586	2956	3325	3695	
300	706,9	212,1	424,1	636,2	848,2	1060	1272	1484	1696	1909	2121	2333	2545	2969	3393	3817	4241	

Load-Pressure		Gewicht-Druck						Cargaion-Pression						Carga-Presión					
kg		500	750	1000	1500	2000	2500	3000	3500	4000	4500	5000	6000	7000	8000	9000	10000		
Ø mm	cm²	bar																	
35	9,6	51	76	102	153	204	255	306	357	408	459	510	612	714	816	918	1020		
40	12,6	39	59	78	117	156	195	234	273	312	351	390	468	546	625	703	781		
45	15,9	31	46	62	93	123	154	185	216	247	278	308	370	432	493	555	617		
50	19,6	25	38	50	75	100	125	150	175	200	225	250	300	350	400	450	500		
55	23,8	21	31	41	62	83	103	124	145	165	186	206	248	289	330	372	413		
60	28,3	17	26	35	52	69	87	104	121	139	156	173	208	243	278	312	347		
65	33,2	15	22	30	44	59	74	89	103	118	133	148	177	207	237	266	296		
70	38,5	13	19	26	38	51	64	76	89	102	115	127	153	178	204	229	255		
75	44,2	11	17	22	33	44	56	67	78	89	100	111	133	155	178	200	222		
80	50,3	9,8	15	20	29	39	49	59	68	78	88	98	117	137	156	176	195		
85	56,7	8,6	13	17	26	35	43	52	61	69	78	86	104	121	138	156	173		
90	63,6	7,7	12	15	23	31	39	46	54	62	69	77	93	108	123	139	154		
95	70,9	6,9	10	14	21	28	35	42	48	55	62	69	83	97	111	125	138		
100	78,5	6,2	9,4	13	19	25	31	38	44	50	56	62	75	87	100	112	125		
105	86,6	5,7	8,5	11	17	23	28	34	40	45	51	57	68	79	91	102	113		
110	95,0	5,2	7,7	10	16	21	26	31	36	41	47	52	62	72	83	93	103		
115	103,9	4,7	7,1	9,4	14	19	24	28	33	38	43	47	57	66	76	85	94		
120	113,1	4,3	6,5	8,7	13	17	22	26	30	35	39	43	52	61	69	78	87		
125	122,7	4,0	6,0	8,0	12	16	20	24	28	32	36	40	48	56	64	72	80		
130	132,7	3,7	5,5	7,4	11	15	19	22	26	30	33	37	44	52	59	67	74		
140	153,9	3,2	4,8	6,4	9,6	13	16	19	22	26	29	32	38	45	51	57	64		
150	176,7	2,8	4,2	5,6	8,3	11	14	17	19	22	25	28	33	39	44	50	56		
160	201,1	2,4	3,7	4,9	7,3	9,8	12	15	17	20	22	24	29	34	39	44	49		
170	227,0	2,2	3,2	4,3	6,5	8,6	11	13	15	17	19	22	26	30	35	39	43		
180	254,5	1,9	2,9	3,9	5,8	7,7	9,6	12	14	15	17	19	23	27	31	35	39		
190	283,5	1,7	2,6	3,5	5,2	6,9	8,6	10	12	14	16	17	21	24	28	31	35		
200	314,2	1,6	2,3	3,1	4,7	6,2	7,8	9,4	11	13	14	16	19	22	25	28	31		
210	346,4	1,4	2,1	2,8	4,2	5,7	7,1	8,5	9,9	11	13	14	17	20	23	26	28		
220	380,1	1,3	1,9	2,6	3,9	5,2	6,5	7,7	9,0	10,3	12	13	16	18	21	23	26		
240	452,4	1,1	1,6	2,2	3,3	4,3	5,4	6,5	7,6	8,7	9,8	11	13	15	17	20	22		
260	530,9	0,9	1,4	1,8	2,8	3,7	4,6	5,5	6,5	7,4	8,3	9,2	11	13	15	17	19		
280	615,8	0,8	1,2	1,6	2,4	3,2	4,0	4,8	5,6	6,4	7,2	8,0	9,6	11	13	14	16		
300	706,9	0,7	1,0	1,4	2,1	2,8	3,5	4,2	4,9	5,6	6,2	6,9	8,3	9,7	11	13	14		

Ram Ø • Area • Speed • Flow

ft/min	10	20	30	40	50	60	70	80	90	100	110	120	140	160	180	200
Ø inch in²	US gpm															
1,4 1,5	0,8	1,6	2,4	3,2	4,0	4,8	5,6	6,4	7,2	8,0	8,8	9,6	11,2	12,8	14,4	16,0
1,6 2,0	1,0	2,1	3,1	4,2	5,2	6,3	7,3	8,4	9,4	10,5	11,5	12,5	14,6	16,7	18,8	20,9
1,8 2,5	1,3	2,6	4,0	5,3	6,6	7,9	9,3	10,6	11,9	13,2	14,6	15,9	18,5	21,2	23,8	26,5
2,0 3,1	1,6	3,3	4,9	6,5	8,2	9,8	11,4	13,1	14,7	16,3	18,0	19,6	22,9	26,1	29,4	32,7
2,2 3,8	2,0	4,0	5,9	7,9	9,9	11,9	13,8	15,8	17,8	19,8	21,7	23,7	27,7	31,6	35,6	39,5
2 1/2 4,9	2,6	5,1	7,7	10,2	12,8	15,3	17,9	20,4	23,0	25,5	28,1	30,6	35,7	40,8	45,9	51,0
2,6 5,3	2,8	5,5	8,3	11,0	13,8	16,6	19,3	22,1	24,8	27,6	30,4	33,1	38,6	44,2	49,7	55,2
2 3/4 5,9	3,1	6,2	9,3	12,4	15,4	18,5	21,6	24,7	27,8	30,9	34,0	37,1	43,2	49,4	55,6	61,8
3,0 7,1	3,7	7,3	11,0	14,7	18,4	22,0	25,7	29,4	33,1	36,7	40,4	44,1	51,4	58,8	66,1	73,5
3,2 8,0	4,2	8,4	12,5	16,7	20,9	25,1	29,3	33,4	37,6	41,8	46,0	50,2	58,5	66,9	75,3	83,6
3 1/2 9,6	5,0	10,0	15,0	20,0	25,0	30,0	35,0	40,0	45,0	50,0	55,0	60,0	70,0	80,0	90,0	100,0
3,6 10,2	5,3	10,6	15,9	21,2	26,5	31,7	37,0	42,3	47,6	52,9	58,2	63,5	74,1	84,7	95,2	105,8
3,8 11,3	5,9	11,8	17,7	23,6	29,5	35,4	41,3	47,2	53,1	59,0	64,9	70,7	82,5	94,3	106,1	117,9
4,0 12,6	6,5	13,1	19,6	26,1	32,7	39,2	45,7	52,3	58,8	65,3	71,9	78,4	91,5	104,5	117,6	130,7
4,2 13,9	7,2	14,4	21,6	28,8	36,0	43,2	50,4	57,6	64,8	72,0	79,2	86,4	100,8	115,2	129,6	144,0
4 3/8 15,0	7,8	15,6	23,4	31,3	39,1	46,9	54,7	62,5	70,3	78,1	86,0	93,8	109,4	125,0	140,7	156,3
4 1/2 15,9	8,3	16,5	24,8	33,1	41,3	49,6	57,9	66,1	74,4	82,7	90,9	99,2	115,8	132,3	148,8	165,4
4,8 18,1	9,4	18,8	28,2	37,6	47,0	56,4	65,8	75,3	84,7	94,1	103,5	112,9	131,7	150,5	169,3	188,1
5,0 19,6	10,2	20,4	30,6	40,8	51,0	61,2	71,5	81,7	91,9	102,1	112,3	122,5	142,9	163,3	183,7	204,1
5 7/16 23,2	12,1	24,1	36,2	48,3	60,4	72,4	84,5	96,6	108,6	120,7	132,8	144,9	169,0	193,1	217,3	241,4
5 1/2 23,8	12,4	24,7	37,1	49,4	61,8	74,1	86,5	98,8	111,2	123,5	135,9	148,2	172,9	197,6	222,3	247,0
6,0 28,3	14,7	29,4	44,1	58,8	73,5	88,2	102,9	117,6	132,3	147,0	161,7	176,4	205,8	235,2	264,6	294,0
6 1/2 33,2	17,3	34,5	51,8	69,0	86,3	103,5	120,8	138,0	155,3	172,5	189,8	207,0	241,5	276,0	310,5	345,0
6,8 36,3	18,9	37,8	56,6	75,5	94,4	113,3	132,2	151,0	169,9	188,8	207,7	226,6	264,3	302,1	339,8	377,6
7,0 38,5	20,0	40,0	60,0	80,0	100,0	120,0	140,0	160,1	180,1	200,1	220,1	240,1	280,1	320,1	360,1	400,1
7 1/2 44,2	23,0	45,9	68,9	91,9	114,8	137,8	160,8	183,7	206,7	229,7	252,6	275,6	331,5	367,5	413,4	459,3
8,0 50,3	26,1	52,3	78,4	104,5	130,7	156,8	182,9	209,0	235,2	261,3	287,4	313,6	365,8	418,1	470,4	522,6
8 1/2 56,7	29,5	59,0	88,5	118,0	147,5	177,0	206,5	236,0	265,5	295,0	324,5	354,0	413,0	472,0	531,0	590,0
8,8 60,8	31,6	63,2	94,9	126,5	158,1	189,7	221,3	252,9	284,6	316,2	347,8	379,4	442,7	505,9	569,1	632,4
9 1/2 70,9	36,8	73,7	110,5	147,4	184,2	221,1	257,9	294,8	331,6	368,5	405,3	442,2	515,9	589,6	663,3	737,0
10 5/8 88,7	46,1	92,2	138,3	184,4	230,5	276,6	322,6	368,7	414,8	460,9	507,0	553,1	645,3	737,5	829,7	921,9
11,2 98,5	51,2	102,4	153,6	204,9	256,1	307,3	358,5	409,7	460,9	512,2	563,4	614,6	717,0	819,5	921,9	1024,3
12,0 113,1	58,8	117,6	176,4	235,2	294,0	352,8	411,6	470,4	529,1	587,9	646,7	705,5	823,1	940,7	1058,3	1175,9

Ram Ø • Area • Load • Pressure

lbs	1100	1650	2200	3300	4400	5500	6600	7700	8800	10000	11000	13200	15400	17600	19800	22000
Ø inch in²	psi															
1,4 1,5	714,6	1071,9	1429,1	2143,7	2858,3	3572,9	4287,4	5002,0	5716,6	6496,1	7145,7	8574,9	10004,0	11433,2	12862,3	14291,5
1,6 2,0	547,1	820,6	1094,2	1641,3	2188,4	2735,5	3282,6	3829,7	4376,8	4973,6	5471,0	6565,1	7659,3	8753,5	9847,7	10941,9
1,8 2,5	432,3	648,4	864,5	1296,8	1729,1	2161,4	2593,6	3025,9	3458,2	3929,8	4322,7	5187,3	6051,8	6916,4	7780,9	8645,5
2,0 3,1	350,1	525,2	700,3	1050,4	1400,6	1750,7	2100,8	2451,0	2801,1	3183,1	3501,4	4201,7	4902,0	5602,3	6302,5	7002,8
2,2 3,8	289,4	434,1	578,7	868,1	1157,5	1446,9	1736,2	2025,6	2315,0	2630,7	2893,7	3472,5	4051,2	4630,0	5208,7	5787,5
2 1/2 4,9	224,1	336,1	448,2	672,3	896,4	1020,5	1344,5	1568,6	1792,7	2037,2	2240,9	2689,1	3137,3	3585,4	4033,6	4481,8
2,6 5,3	207,2	310,8	414,4	621,6	828,7	1035,9	1243,1	1450,3	1657,5	1883,5	2071,8	2486,2	2900,6	3314,9	3729,3	4143,7
2 3/4 5,9	185,2	277,8	370,4	555,6	740,8	926,0	1111,2	1296,4	1481,6	1683,6	1852,0	2222,4	2592,8	2963,2	3333,6	3704,0
3,0 7,1	155,6	233,4	311,2	466,9	622,5	778,1	933,7	1089,3	1244,9	1414,7	1556,2	1867,4	2178,7	2489,9	2801,1	3112,4
3,2 8,0	136,8	205,2	273,5	410,3	547,1	683,9	820,6	957,4	1094,2	1243,4	1367,7	1641,3	1914,8	2188,4	2461,9	2735,5
3 1/2 9,6	114,3	171,5	228,7	343,0	457,3	571,7	686,0	800,3	914,7	1039,4	1143,3	1372,0	1600,6	1829,3	2058,0	2286,6
3,6 10,2	108,1	162,1	216,1	324,2	432,3	540,3	648,4	756,5	864,5	982,4	1080,7	1296,8	1513,0	1729,1	1945,2	2161,4
3,8 11,3	97,0	145,5	194,0	291,0	388,0	485,0	582,0	678,9	775,9	881,7	969,9	1163,9	1357,9	1551,9	1745,9	1939,8
4,0 12,6	87,5	131,3	175,1	262,6	350,1	437,7	525,2	612,7	700,3	795,8	875,4	1050,4	1225,5	1400,6	1575,6	1750,7
4,2 13,9	79,4	119,1	158,8	238,2	317,6	397,0	476,4	555,8	635,2	721,8	794,0	952,8	1111,6	1270,4	1429,1	1587,9
4 3/8 15,0	73,2	109,8	146,3	219,5	292,7	365,9	439,0	512,2	585,4	665,2	731,7	878,1	1024,4	1170,8	1317,1	1463,4
4 1/2 15,9	69,2	103,7	138,3	207,5	276,7	345,8	415,0	484,1	553,3	628,8	691,6	830,0	968,3	1106,6	1244,9	1383,3
4,8 18,1	60,8	91,2	121,6	182,4	243,2	303,9	364,7	425,5	486,3	552,6	607,9	729,5	851,0	972,6	1094,2	1215,8
5,0 19,6	56,0	84,0	112,0	168,1	224,1	280,1	336,1	392,2	448,2	509,3	560,2	672,3	784,3	896,4	1008,4	1120,5
5 7/16 23,2	47,4	71,1	94,7	142,1	189,5	236,9	284,2	331,6	379,0	430,6	473,7	568,4	663,2	757,9	852,7	947,4
5 1/2 23,8	46,3	69,4	92,6	138,9	185,2	231,5	277,8	324,1	370,4	420,9	463,0	555,6	648,2	740,8	833,4	926,0
6,0 28,3	38,9	58,4	77,8	116,7	155,6	194,5	233,4	272,3	311,2	353,7	389,0	466,9	544,7	622,5	700,3	778,1
6 1/2 33,2	33,1	49,7	66,3	99,4	132,6	165,7	198,9	232,0	265,2	301,4	331,5	397,8	464,1	530,4	596,7	663,0
6,8 36,3	30,3	45,4	60,6	90,9	121,2	151,4	181,7	212,0	242,3	275,4	302,9	363,5	424,0	484,6	545,2	605,8
7,0 38,5	28,6	42,9	57,2	85,7	114,3	142,9	171,5	200,1	228,7	259,8	285,8	343,0	400,2	457,3	514,5	571,7
7 1/2 44,2	24,9	37,3	49,8	74,7	99,6	124,5	149,4	174,3	199,2	226,4	249,0	298,8	348,6	398,4	448,2	498,0
8,0 50,3	21,9	32,8	43,8	65,7	87,5	109,4	131,3	153,2	175,1	198,9	218,8	262,6	306,4	350,1	393,9	437,7
8 1/2 56,7	19,4	29,1	38,8	58,2	77,5	96,9	116,3	135,7	155,1	176,2	193,8	232,6	271,4	310,2	348,9	387,7
8,8 60,8	18,1	27,1	36,2	54,3	72,3	90,4	108,5	126,6	144,7	164,4	180,9	217,0	253,2	289,4	325,5	361,7
9 1/2 70,9	15,5	23,3	31,0	46,6	62,1	77,6	93,1	108,6	124,1	141,1	155,2	186,2	217,3	248,3	279,3	310,4
10 5/8 88,7	12,4	18,6	24,8	37,2	49,6	62,0	74,4	86,8	99,3	112,8	124,1	148,9	173,7	198,5	223,3	248,1
11,2 98,5	11,2	16,7	22,3	33,5	44,7	55,8	67,0	78,2	89,3	101,5	111,7	134,0	156,3	178,6	201,0	223,3

"R10" PIPE RUPTURE VALVE

General Information & Application Data

GENERAL DESCRIPTION

The design is proven with twenty years of acceptance in the elevator industry. To date over 100,000 units have been sold.

In the event of a failure in the cylinder supply line or when the down speed exceeds the field adjustable limit, the "R10" activates, bringing the car to a smooth and safe stop. The deceleration rate is comfortable (less than 1g) to passengers. For safety reasons the deceleration rate is a non-adjustable built-in feature of the "R10".

The "R10" offers an inline or right angle design, whichever best simplifies piping for **new** installations or modernization. The available sizes are for 3/4 to 3 inch pipe. The standard couplings are either N.P.T. threads or Victaulic fittings. A combination of N.P.T. threads and Victaulic can be accommodated.



OPTIONS

• LOWERING SPEED

With this option, once the "R10" is actuated the car will not come to a complete stop, but will continue down to the bottom floor at a rate which is field adjustable.

• PILOT PORT

This option is for dual cylinder systems using two "R10's". Connecting the pilot ports of each valve ensures that both will close almost simultaneously, regardless where the rupture occurs.

• NORMALLY CLOSED SWITCH (N.C.S.)

The "R10" can be fitted with an electrical switch with both opening and closing contacts. The N.C.S. is rated for 230V @ 6A.

figure 1

PIPE RUPTURE VALVE "R10"	TRIPPING FLOW RATE (GPM)	MAX. PRESSURE (PSI)
.75 INCHES	2 - 26	1400
1 INCH	27-45	1400
1.5 INCHES	46-110	1400
2 INCHES	111-208	1200
2.5 INCHES	209-318	1000
3 INCHES	319-546	800

APPLICATION DATA

For proper sizing of the "R10" refer to figure 1. Ensure that the tripping flow rate (GPM x 1.25) is within the range for a given valve.



Electro-Mech. Industries

2420 Hamilton Rd., Arlington Heights, IL 60005
Phone (847) 593-4900 Fax (847) 593-1394

SPEC.: B7400-A
DATE: FEB 98

Manufactured by:



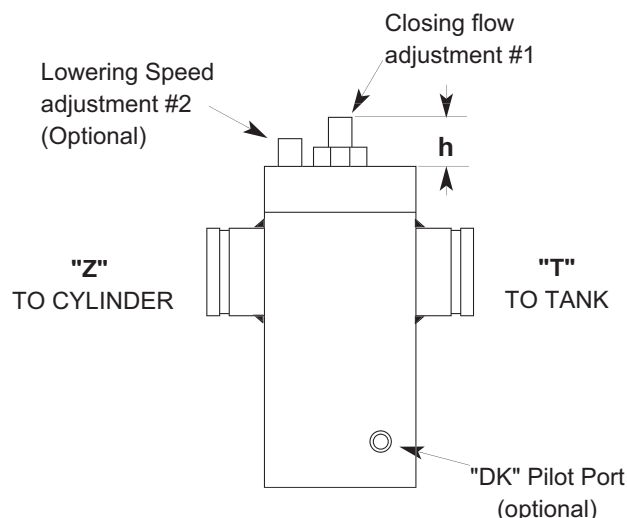
"R10" PIPE RUPTURE VALVE

INSTALLATION AND ADJUSTMENT

Turning the closing flow adjustment clockwise (decreasing the "h" dim.), the valve closes with increased oil flow. Refer to fig. 2 for approximate closing flows for various "h" dimensions.

The lowering speed option prevents the "R10" from closing fully providing a slow lowering speed. By turning the lowering speed adjustment clockwise the lowering speed is increased.

Pilot Port is used for dual cylinder systems using two "R10's", connect the pilot ports together using 1/4" pipe.



INSTALLATION

- Connect "Z" side of "R10" to Cylinder
- Connect "T" side of "R10" to Supply Line

ADJUSTMENTS (with rated load)

- Set closing flow adjustment #1 (dim. "h") to the approximate height refer to fig. 2
- Run car down at full speed
- Adjust closing flow (adjustment #1) to activate valve at full speed
- Turn closing flow adjustment clockwise per fig. 3 to obtain final setting
- Run car up under normal operation
- Verify closing flow by further opening down valve or increasing load to achieve over speed condition
- Verify that the valve will not trip at full speed with rated load during a full down run

CAUTION: In case the R10 is set incorrectly, be prepared to stop the car by other means before it enters the pit.

Note: For dual Cylinder applications perform adjustments to both valves.

For every clockwise turn of adjustment #1 the closing flow will increase per the following chart:

R10	GPM
3/4"	+4.7
1"	+7.8
1 1/2"	+9.9
2"	+14
2 1/2"	+22
3"	+33

Fig. 3

"h" Dimensions (Inches)

"R10" SIZE	CLOSING FLOW (GPM)														
	5	10	25	50	75	100	120	160	200	250	300	350	400	546	
3/4"	1.05	0.93	0.7												
1"		1.1	0.85	0.6											
1 1/2"			1.05	0.8	0.65	0.5									
2"				1.1	0.95	0.85	0.75	0.62	0.42						
2 1/2"						1.05	1	0.9	0.75	0.6	0.42				
3"									1.05	0.96	0.87	0.75	0.68	0.4	

Fig. 2



Electro-Mech. Industries

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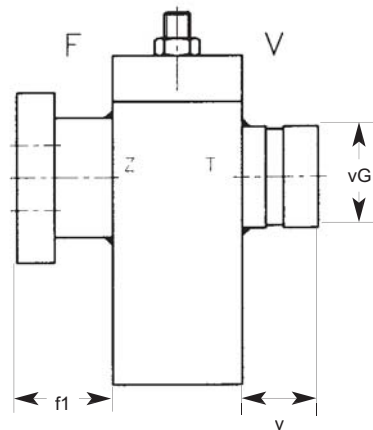
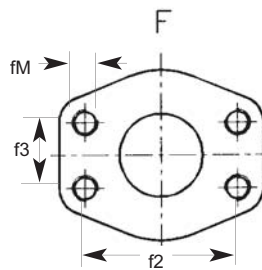
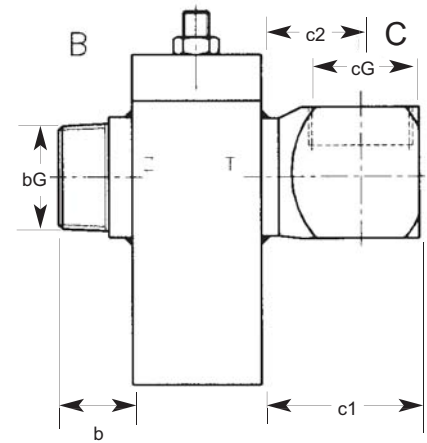
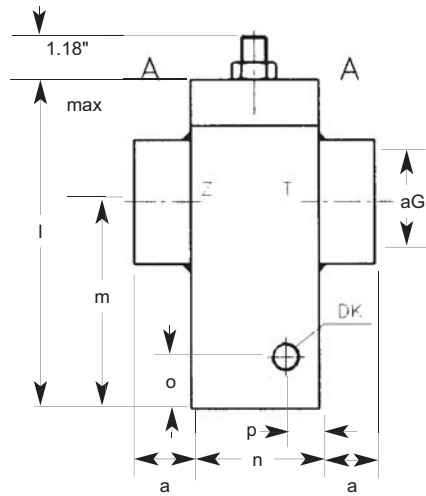
SPEC.: 7402-A
DATE: Jan. 96

Manufactured by:



"R10" PIPE RUPTURE VALVE

Dimensional Drawings



R10	A		B		C			F					V		l	m	n	o	p	wt. (lbs)
	aG NPT	a a	bG NPT	b	cG NPT	c1	c2	DN	fM	f1	f2	f3	vG	V						
0.75	0.75	0.71	0.75	1.26	0.75	2.24	1.3						1.5	1.5	4.13	2.44	1.97	0.59	0.47	3.75
1	1	0.83	1	1.26	1	2.24	1.3						1.32	1.25	4.13	2.44	1.97	0.59	0.47	4
1.5	1.5	1.02	1.5	1.38	1.5	2.83	1.42	1.5	M12	1.73	2.76	1.41	1.9	1.4	5.94	3.7	2.36	0.94	0.59	5.75
2	2	1.1	2	1.5	2	3.27	1.77	2	M12	1.77	3.06	1.69	2.38	1.5	6.73	4.25	3.15	0.79	0.71	14
2.5	2.5	1.18	2.5	1.77	2.5	4.06	2.16	2.52	M12	1.97	3.5	2	2.88	1.75	7.72	4.76	3.94	0.98	0.87	26.8
3	3	1.39	3	1.77	3	4.72	2.56	2.99	M16	1.97	4.19	2.44	3	1.8	9.65	5.87	4.72	0.98	0.87	46.3



Electro-Mech. Industries

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SPEC.: B7401-A
DATE: JAN. 95

Manufactured. by:



DF30-70 OIL COOLER

TECHNICAL DATA

Principals of Operation:

The **DF30-70** Oil Cooler is essentially a heat pump designed specifically for hydraulic elevators. The oil is removed from the power unit and passed through the cooling core. At the same time ambient air is passed over the core. The air is the medium which removes the heat from the oil. Since the heat from the oil must go someplace, the **DF30-70** relies on adequate room ventilation to remove the heat from the machine room or any remote location.

The **DF30-70** will dissipate 70,000 BTU's per hour @ 100°F Initial Temperature Difference (ITD). ITD is the difference between the incoming oil temperature minus the ambient air temperature. The following chart illustrates the heat dissipation over a wide range of oil and air temperatures:

		AIR TEMPERATURE (°F)								
		30	40	50	60	70	80	90	100	110
OIL TEMPERATURE (°F)	30	0								
	40	7000	0							
	50	14000	7000	0						
	60	21000	14000	7000	0					
	70	28000	21000	14000	7000	0				
	80	35000	28000	21000	14000	7000	0			
	90	42000	35000	28000	21000	14000	7000	0		
	100	49000	42000	35000	28000	21000	14000	7000	0	
	110	56000	49000	42000	35000	28000	21000	14000	7000	0
	120	63000	56000	49000	42000	35000	28000	21000	14000	7000
	130	70000	63000	56000	49000	42000	35000	28000	21000	14000
	140	77000	70000	63000	56000	49000	42000	35000	28000	21000
	150	84000	77000	70000	63000	56000	49000	42000	35000	28000
	160	91000	84000	77000	70000	63000	56000	49000	42000	35000



Electro-Mech. Industries

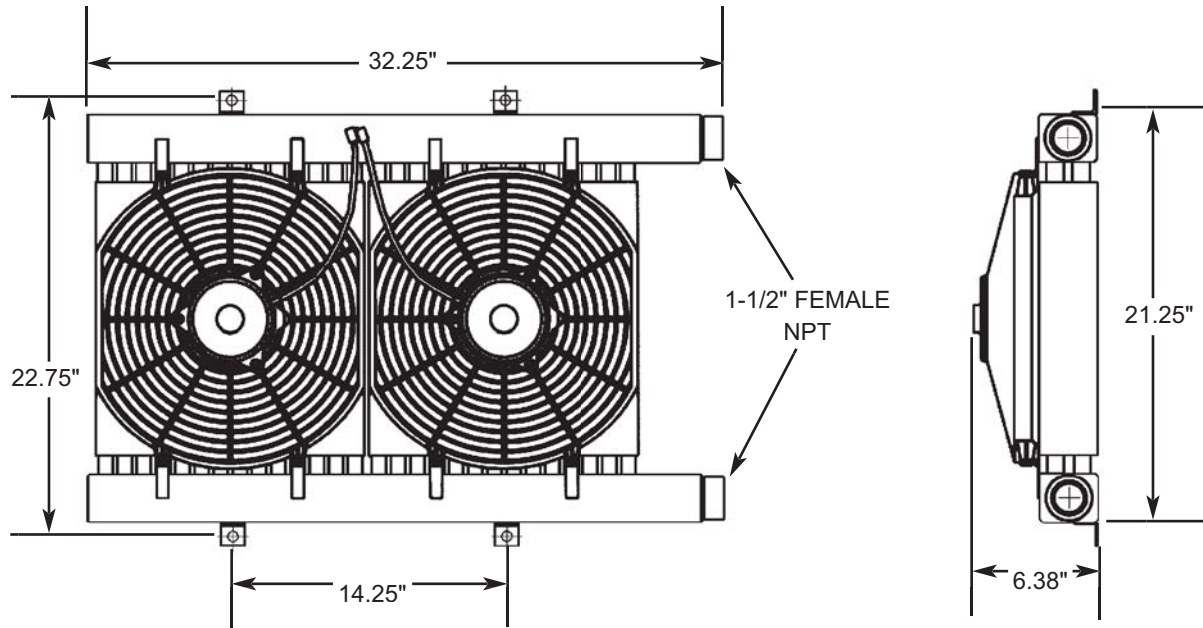
2420 Hamilton Rd., Arlington Heights, IL 60005
Phone (847) 593-4900 Fax (847) 593-1394

SPEC.: 7089-A
DATE: APRIL 96

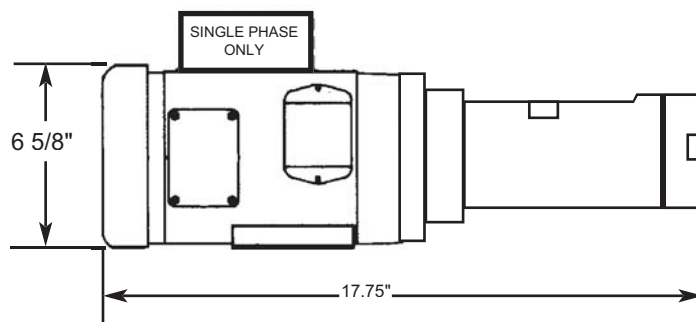
DF30-70 OIL COOLER

DIMENSIONS

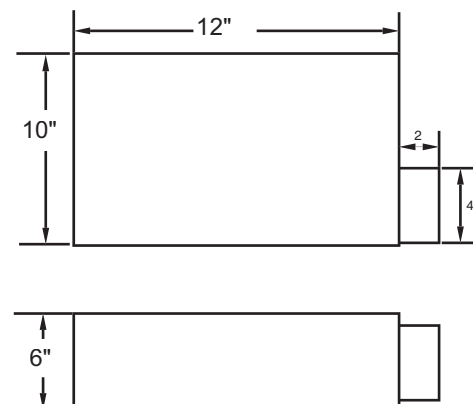
HEAT EXCHANGER



PUMP/MOTOR COMBINATION



CONTROLLER



Electro-Mech. Industries

2420 Hamilton Rd., Arlington Heights, IL 60005
Phone (847) 593-4900 Fax (847) 593-1394

SPEC.: 7106-A
DATE: JUNE 2007

DF30-70 OIL COOLER

ELECTRICAL DATA

3 PHASE PUMP MOTOR POWER SUPPLY

VOLTAGE	200	230	460
F.L. AMPS	6.1	6.0	3.0

CONTROL POWER: 115 VOLTS SINGLE PHASE

ELECTRICAL CONNECTIONS

1. FROM SERVICE PANEL TO CONTROLLER

Three conductors (110vac power supply H, N, G)
Three conductors (3ph power in)

2. FROM CONTROLLER TO THERMOSTAT

Two conductors

3. FROM CONTROLLER TO HEAT EXCHANGER

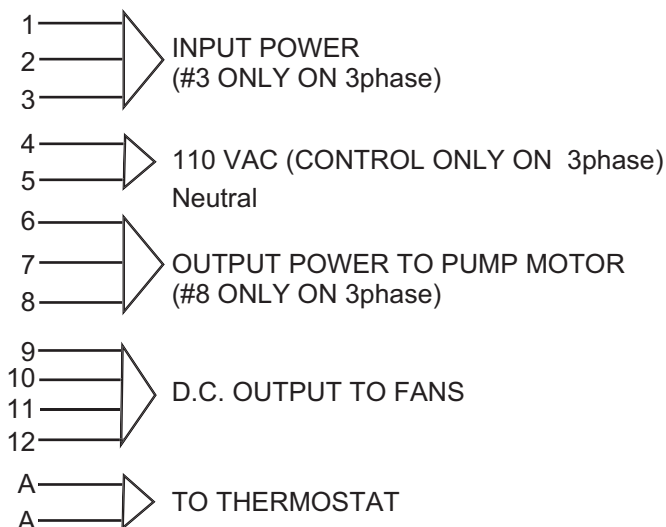
Four conductors

4. FROM CONTROLLER TO PUMP MOTOR

Three conductors (3ph)

CONNECTION DIAGRAMS

LEADS WITHIN TERMINAL BOX OF DF30-70



Electro-Mech. Industries

2420 Hamilton Rd., Arlington Heights, IL 60005
Phone (847) 593-4900 Fax (847) 593-1394

SPEC.: 7105-R6
DATE: SEPT. 04

EK718-75 WATER COOLED OIL COOLER

Advantages of the EK718-75

- * Increased Motor & Valve Life
- * Improved Valve Control & Adjustments
- * Consistant Elevator Performance
- * Heat Transfer Occurs Away from Elevator Control Equipment

Principals of Operation:

The EK718-75 is a parallel cooling system for extreme duty hydraulic elevators. The oil is removed from the power unit and passes through the heat exchanger. At the same time cooling water passes through the core. The water is the medium which removes the heat from the oil. This results in efficient cooling without increasing the machine room temperature. Since there are no cooling fans, the noise generated by the system is negligible.

The system will dissipate 75,000 Btu/hr. @ 36 deg (F) Inital Temperature Difference (ITD) with a water flow of 10 GPM. ITD is the temperature difference between the incoming oil minus the incoming water.

Water temperature and flow have a linear effect on heat dissipation.

By increasing the water flow and ITD by 10% (11 GPM; 40 deg(F) ITD), the system will dissipate **90,750 Btu/hr**

Performance Data:

Power Supply (3ph)..... 200V 6.1A; 230V 6A; 460V 3A

Heat Dissipation..... 75,000 Btu/hr. @ 36 Deg F ITD

Water Pressure..... 140 psi Max.

Water Flow..... 10 GPM

Pressure Drop:

Shell Side (Oil)..... 7 psi

Tube Side (Water)..... 3 psi @ 10GPM



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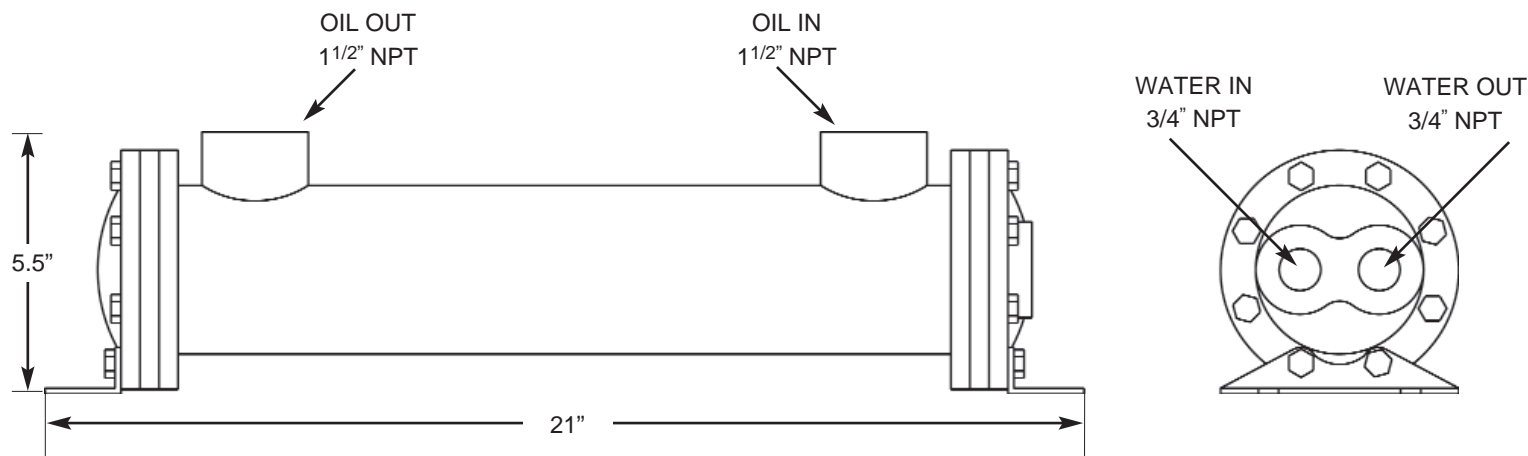
SPEC.: 7043-D

DATE: Sept. 2015

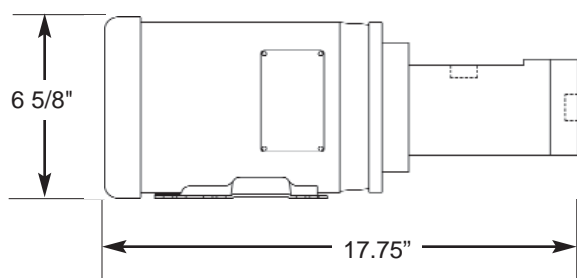
EK718-75 WATER COOLED OIL COOLER

DIMENSIONS AND CONNECTION DIAGRAM

HEAT EXCHANGER



PUMP/MOTOR COMBINATION



CONTROLLER

8 X 8 X 4 JUNCTION BOX

CONNECTION DIAGRAM

Connect Solenoid NEUTRAL to wire 5

1	——	POWER IN
2	——	POWER IN
3	——	POWER IN
4	——	110H
5	——	110N
6	——	TO PUMP-MOTOR
7	——	TO PUMP-MOTOR
8	——	TO PUMP-MOTOR
A	——	TO THERMOSTAT
F	——	FROM THERMOSTAT
10	——	110H TO SOLENOID

Supply Includes

1 - Heat Exchanger, Pump, Motor & Thermostat
1 - Pump & Motor
1 - Thermostat
20' - 1" Hose
1 - Solenoid Valve
All Misc. Hardware to complete installation
(including Teflon Tape)



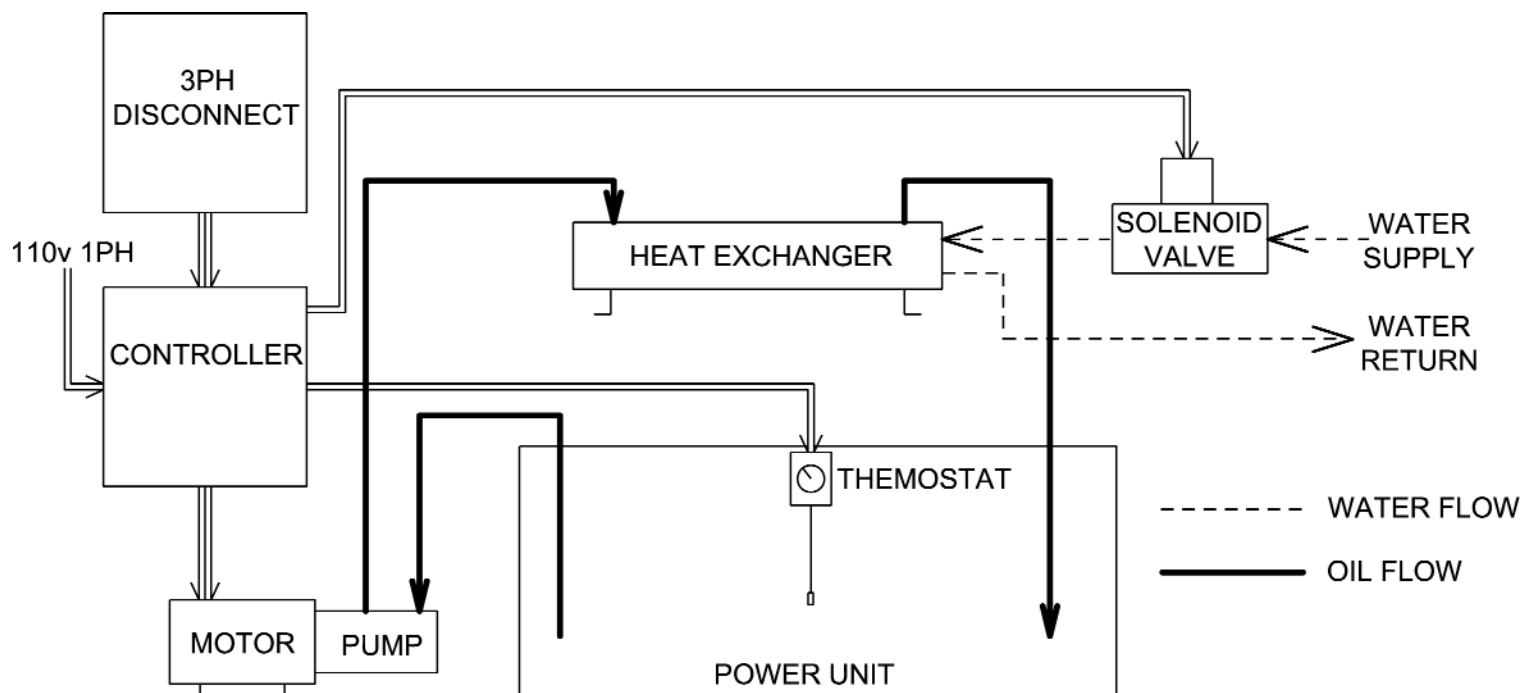
Electro-Mech Industries

250 Hamilton Rd., Arlington Heights, IL 60005
Phone: (847) 593-4900 Fax (847) 593-1394

SPEC.: 7108-E
DATE: July 2016

EK718-75 WATER COOLED OIL COOLER

BLOCK DIAGRAM



TECHNICAL SUBMITTAL

Heat Exchanger:

Type: Shell & Tube
Cooling Capacity: 75,000 btu/hr @ 36°F Temp Differential
Water Requirements: Flow: 10GPM
Max. Pressure: 140psi Pressure Drop: 3 psi @ 10GPM

Motor: 2hp 1800srpm 200-230/460V 3ph 60Hz 145TC ODP
Pump: Screw
Thermostat: Remote Bulb
Oil Hose: 20 feet of 1" PVC

Equipment Supplied: *3PH Disconnect & Power
by Others: *110V 1PH Control Power
*Water piping



Electro-Mech Industries

250 Hamilton Rd., Arlington Heights, IL 60005
Phone: (847) 593-4900 Fax (847) 593-1394

SPEC.:
DATE: Sept. 2015

WEDGE SOCKETS



- This product line is approved for use in all fifty states and Canada. With separate approvals for NYC and the State of California.
- Reduces labor costs versus babbitt and resin socketing.
- Easy installation and adjustment
- It's more cost effective to discard your old babbitt sockets during reroping or when you have to take the "stretch" out of your existing cable.
- Wedge and socket are both stamped and color coded, thus the inspection process is safer and easier than other wedge socket manufacturers.
- Performance tested using IWRC wire rope, thus exceeding the standards of A17.1 and B44 codes.
- Supply includes socket & rod assembly, wedge, isolation spring assembly, two nuts and two wire clips.



Electro-Mech. Industries

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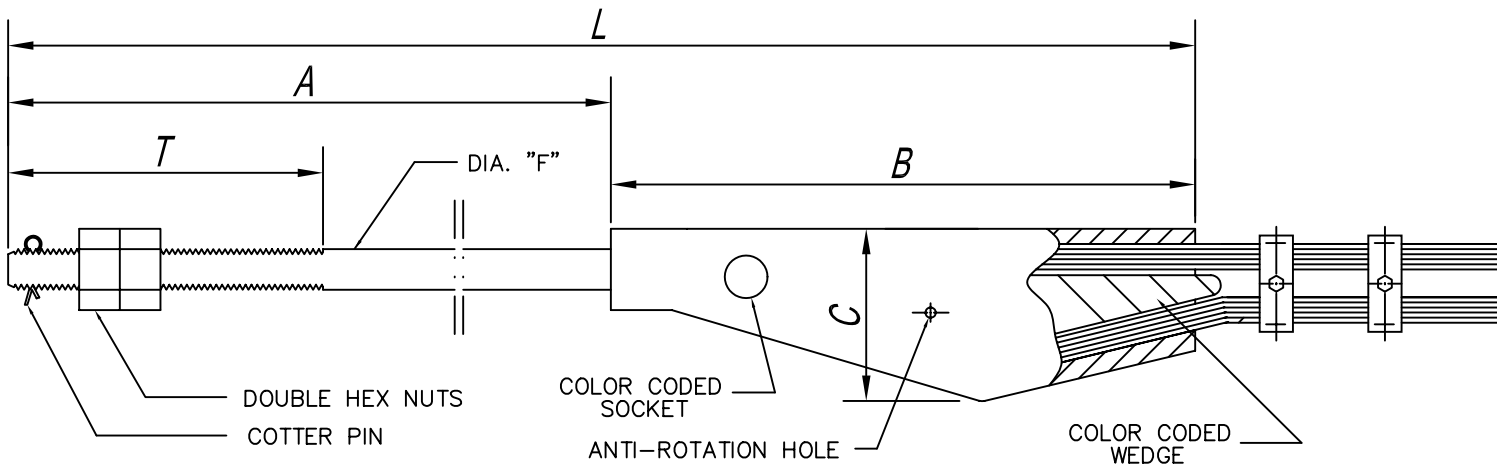
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DATE: Feb. 2007

MANUFACTURED BY:

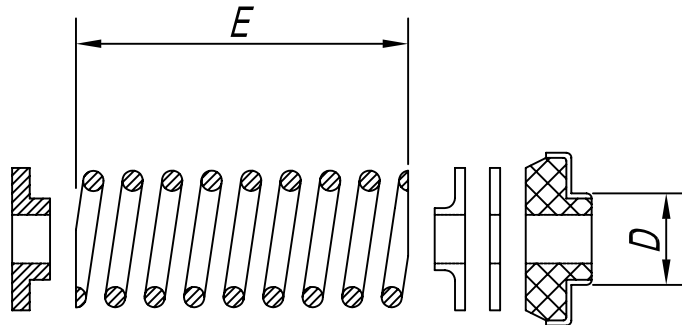


WEDGE SOCKETS

Wedge & Socket Dimensions



Isolation Spring Dimensions



PART NUMBER	ROPE SIZE	A	B	C	D	E	F	L	T	COLOR CODE
WDGSKT375X12	3/8" (10mm)	12.38	7.50	2.13	1.03	3.88	5/8	19.50	4.50	RED
WDGSKT500X18	1/2" (13mm)	14.00	8.75	2.50	1.25	4.88	3/4	23.00	7.50	BLUE
WDGSKT500X24	1/2" (13mm)	23.00	8.75	2.50	1.25	4.88	3/4	31.00	11.50	BLUE
WDGSKT625X18	5/8" (16mm)	15.50	7.50	3.06	1.25	6.25	7/8	23.00	8.25	YELLOW
WDGSKT625X24	5/8" (16mm)	23.00	7.50	3.06	1.25	6.25	7/8	30.25	11.50	YELLOW

Data subject to change without notice



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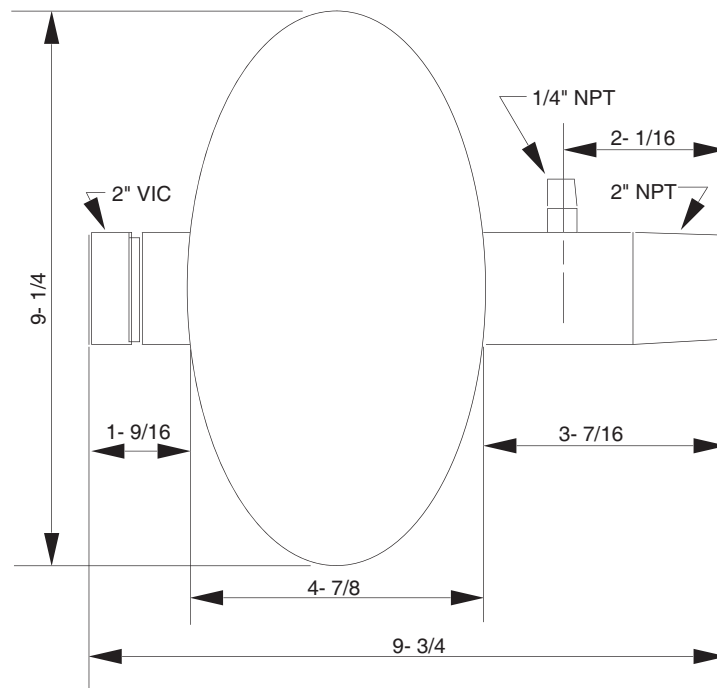
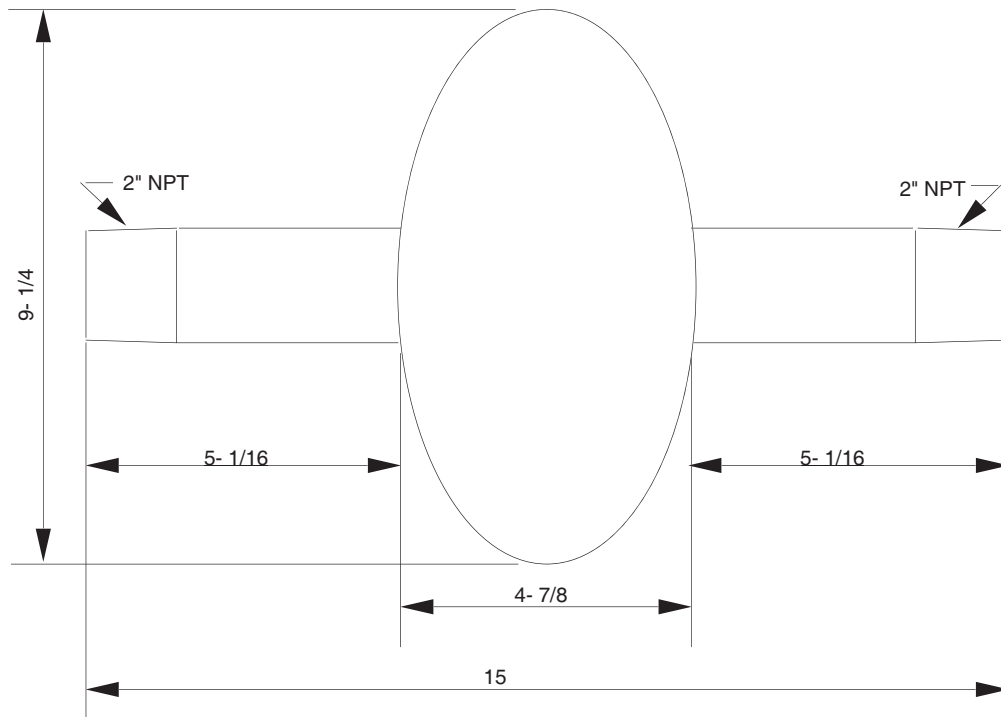
SPEC.: WDG3500 Pg2
DATE: Feb. 07

MANUFACTURED BY:



2-MC Muffler

DIMENSIONS



Electro-Mech. Industries

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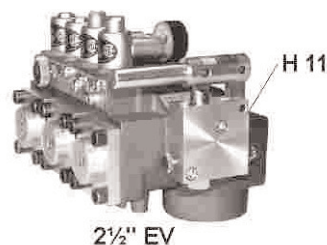
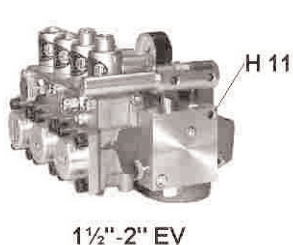
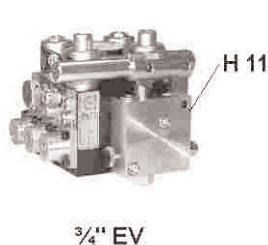
SPEC.: 2-MC8501

DATE: Dec 95

MANUFACTURED BY:

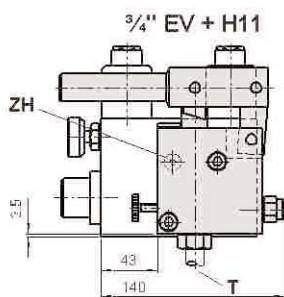
2-MC

HAND PUMPS

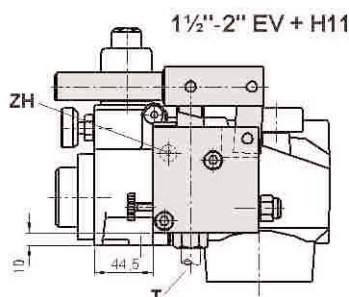


DESCRIPTION

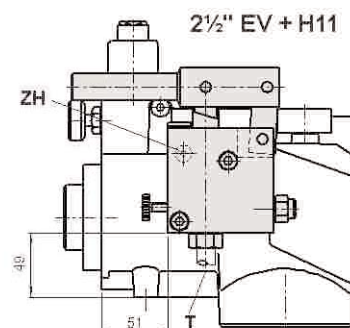
H11 and H12 are for application with hydraulic lifting or pressing equipment, for emergency operation of hydraulic elevators and for pressure testing hydraulic systems in general. The H11 is constructed for side mounting whereas the H12 is fitted with a base plate. Both the H11 and H12 have a built-in relief valve. The relief valve should be adjusted to prevent unintentionally high pressures being applied to the systems. A built-in manual valve for releasing the system pressure is available as an option.



See also EV prospect.



Siehe auch EV Prospekt.

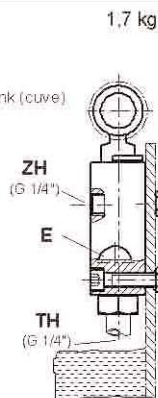
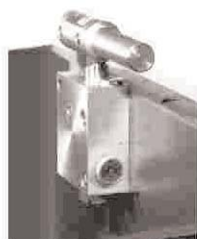


Autres dates voir prospectus EV.

Véase también prospecto EV.

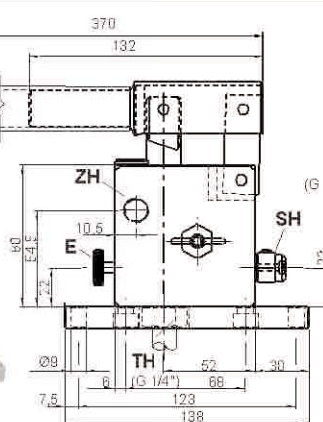
H 11T

For mounting inside tank.
Für Montage am Tankinneren.
Pour montage à l'intérieur du tank (cuve).
Por montaje dentro del tank.

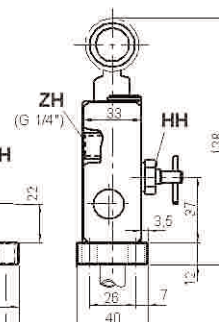


H 12

For separate installation.
Für separate Montage.
Pour installation séparée.
Por instalación separado.



2.1 kg



Electro-Mech. Industries

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Phone (847) 593-4900 Fax (847) 593-1394

SPEC.: H1900-A
DATE: JULY. 95

Manufactured by:



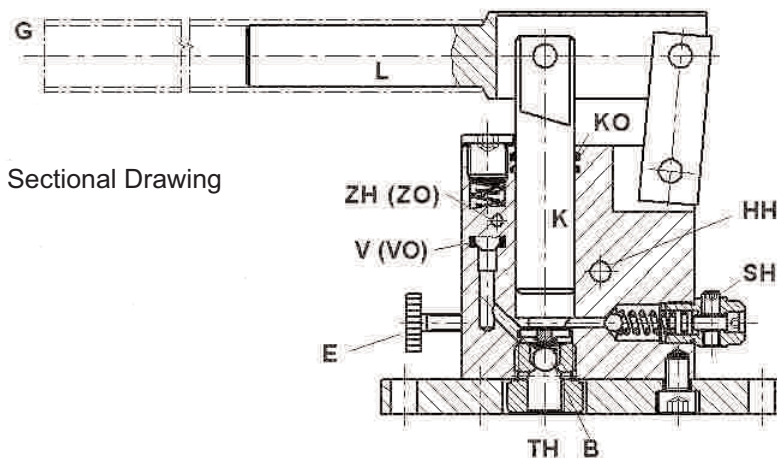
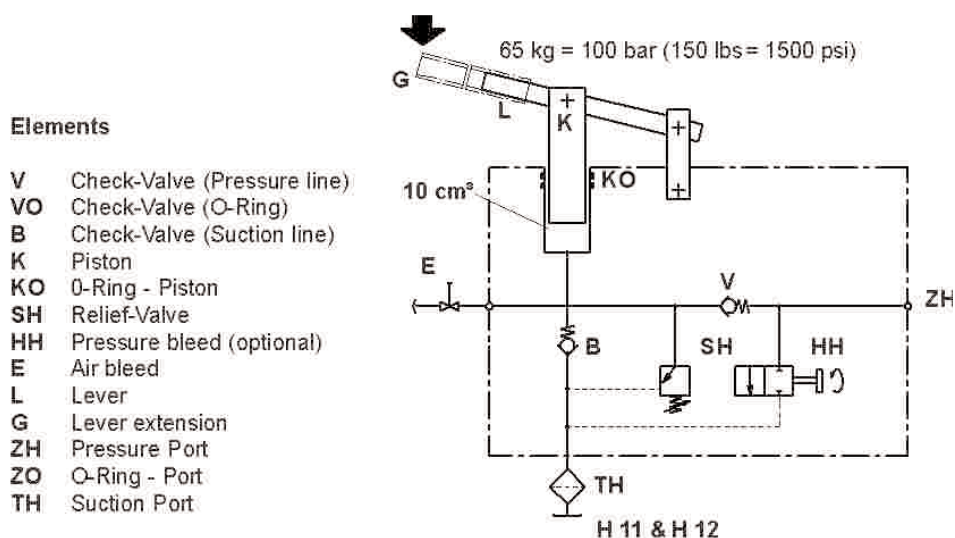
HAND PUMPS

INSTALLATION

The I.D. of the suction line should not be less than 5/16". The connection of the suction line to the hand pump must be a perfect seal. A filter fitted to the bottom end of the suction line is recommended.

AIR BLEED

If the operation of the pump does not produce a build up of system pressure, it may be necessary to release trapped air out of the hand pump by opening the air bleed screw half a turn and pumping several strokes until oil appears at the screw threads.



Electro-Mech. Industries

2420 Hamilton Rd., Arlington Heights, IL 60005
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SPEC.: H1901-A
DATE: JULY. 95

Manufactured by:



TANK HEATERS

TECHNICAL DATA

Voltage= 110v or 230v

Power= 250W

On temp.= 77° F (Other temperatures available)

Off temp.= 85° F



APPLICATION

The "BK" tank heaters are intended for application in hydraulic control systems for machine tools, presses, hydraulic elevators, servo systems, etc. where overnight conditions or periods of non-operation cause the hydraulic fluid to fall below desirable levels.

The heater is designed to maintain up to approximately 130 gallons of oil in an unheated room at a temperature of 77° F to 85° F.

CONSTRUCTION

Through the large heat dissipation area of the housing, the heater's surface temperature remains under 120° F and thereby avoids oxidation or premature aging of the oil. The built-in thermostat switches the heating element on at an oil temperature of approximately 77° F and off again when the oil temperature has risen to approximately 85° F.

Should the heater be in an unsubmerged state with an ambient temperature below 77° F, the maximum surface temperature of the heater will not exceed 190° F.

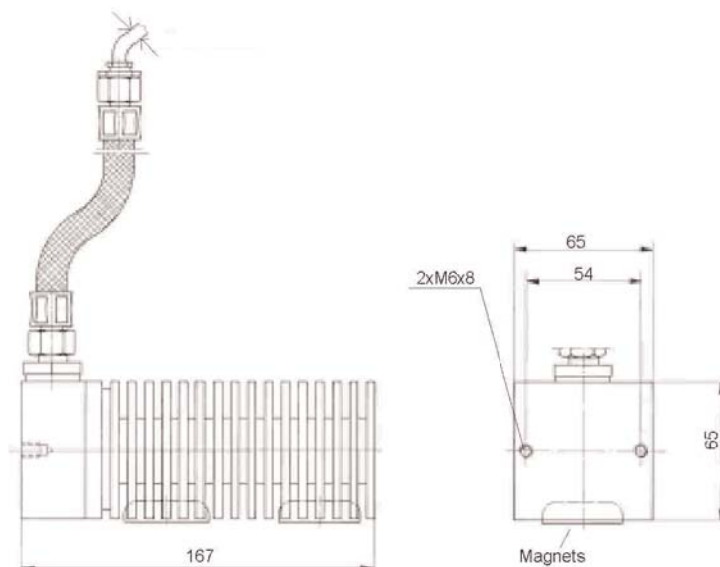
INSTALLATION

The heater is supplied with 98 inches of electrical cable sheathed over a length of 48 inches by oil resistant hose. The exposed portion of the cable should not be submerged in oil.

Two powerful magnets are fitted to underneath the heater so that the installation in a metal tank is simply a matter of placing the heater at the bottom surface of the tank. Alternatively, the heater can be mounted by means of two available M6 holes. The magnets also extract fine metal particles from the oil thereby protecting the pump from wear.

Since the heated oil convects upwards, oil below the heater remains cool. Therefore it is important to locate the heater at the lowest possible area within the tank.

Due to the location of the thermostat, the heater should be mounted so that the cable inlet is directed upwards.



Electro-Mech. Industries

2420 Hamilton Rd., Arlington Heights, IL 60005
Phone (847) 593-4900 Fax (847) 593-1394

SPEC.: BK2001-A
DATE: JULY 95

Manufactured by:



RESIDENTIAL CONTROLLERS

Page 1

The 4M2 series of residential controllers is changing the way the residential elevator market purchases controllers. Currently controllers are purchased as a job specific item after the homeowner has defined any optional features. The 4M2 allows the controller to become a **STOCKED ITEM** because all optional features are incorporated into every unit. The OEM or contractor simply takes a unit from inventory and makes it job specific within minutes. It also allows customer changes and future upgrades to become seamless and cost effective. This purchasing method allows a mid-sized company the benefit of volume pricing.

System Description:

The 4M2 is a line of programmable microprocessor based controllers designed for the North American residential elevator market. This reliable controller fulfills all A17.1 requirements and is ETL listed for residential elevators. The 4M2 can operate in either single automatic or constant pressure modes and accommodates 2-4 stops, short floors, two speeds in both directions, two way re-leveling, retiring cam, fixed cam or four electric locks, two automatic gate operators, four swing door operators, emergency lowering and an emergency light output. It can be used with hatch switches or a magnetic landing system such as our SEL2. All relays that operate external devices are socket mounted to allow easy field replacement.

The 4M2 incorporates a twenty event log to track system events. The system also tracks the number of runs and re-levels. Both the log and counters require a password before they can be cleared.

The entire line of controllers is housed in a 20 x 20 x 6 ¾ inch cabinet.

The price point for this line is less than a basic relay logic unit.

There are four basic models to choose from depending on your drive system

<u>Drive System</u>	<u>Part Number</u>
Hydraulic (1 contactor)	4M2H2
Hydraulic (2 contactors)	4M2H2A
Single Speed Drum or Traction	4M2SS
V.V.V.F. Drum or Traction	4M2VF

This product line conforms to UL508A, ASME A17.1A, ASME A17.5 and CSA-B44-94.

Complete technical information available upon request.

Mfg. By:



Electro-Mech. Industries

250 Hamilton Road, Arlington Heights, IL 60005
Phone (847) 593-4900 Fax (847)593-1394



Hardware Features:

- Microprocessor based
- 3hp 230V contactor(s)
- 2 to 4 stops
- Red LED's on all inputs
- Yellow LED's on all outputs
- Emergency light output -> 24vdc
- Supports two Power Gate Operators
- Supports four Swing Door Operators
- Supports the following H. Door interlocks
 - Retiring Cam
 - Fixed Cam
 - Electric Door Locks (24vdc)
- Supports the following drive systems
 - Single Speed Drum
 - VVVF Drum
 - Hydraulic (110vac coils)
 - Single coil
 - Three coil (common H.S.)
 - Four coil
- Selector Type -> 24vdc Active Low
- Battery Lowering (Hydro only)
- RS232 Port for PC interface

Software Features:

- Two Modes of Operation
 - Single Automatic Pushbutton
 - Constant Pressure
- Password Protected
- Two way Leveling (re-level Hydro only)
- Supports Short Floors
- Selectable Call Button Fault Indication
- Adjustable Gate Open timer
- Adjustable Swing Door Close timer
- Adjustable Run timer
- Adjustable Non Interference timer
- Adjustable Car Light timer
- Adjustable Call Cancel timer
- 20 Event LIFO Log
- On Board Counters
 - Total Trip
 - Run
 - Re-level
- Delay Up Stop
- Selectable Homing Floor
- Adjustable Homing Timer
- Auto Shutdown Counter
- Relevel Shutdown Counter

Optional Equipment:

1. Portable or Controller Mounted Programming tool
2. Five horsepower contactor(s)
3. Magnetic Landing System (Model:SELECTOR2)

Mfg. By:



Electro-Mech. Industries

250 Hamilton Road, Arlington Heights, IL 60005
Phone (847) 593-4900 Fax (847) 593-1394



RESIDENTIAL CONTROLLERS

Page 3

INPUTS

The following are 24vdc Active High

MSC Main Safety Chain
GC Gate Switch
HDC Hatch Doors Closed
HDL Hatch Doors Locked
LPS Low Pressure Switch
UT Up Terminal Limit
LT Down Terminal Limit
OL Motor Overload

The following are 24vdc Active Low

UL Up Leveling
DL Down Leveling
DZ Door Zone
P1 Position 1
P2 Position 2
P3 Position 3
P4 Position 4
DOB Door Open Button

OUTPUTS

RP	Run Contactor	110vac 1A
UP	Up Contactor	110vac 1A
UP	Up Coil	110vac 1A
DN	Down Coil / Contactor	110vac 1A
HSU	H.S. Up Coil	110vac 1A
HDS	H.S. Down Coil	110vac 1A
HSC	H.S. Common Coil	110vac 1A
AL	Automatic Light	110vac 3A
RC	Retiring Cam	24vdc .2A
1EL	Door Lock FL 1	24vdc .5A
2EL	Door Lock FL 2	24vdc .5A
3EL	Door Lock FL 3	24vdc .5A
4EL	Door Lock FL 4	24vdc .5A
OK	System Checking	24vdc
OPF	Gate Op. Front	24vdc .2A
OPR	Gate Op. Rear	24vdc .2A
BZ	Buzzer	24vdc .2A
EL	Emergency Light	24vdc .5A
PD1	Swing Door Op 1	Dry Contact
PD2	Swing Door Op 2	Dry Contact
PD3	Swing Door Op 3	Dry Contact
PD4	Swing Door Op 4	Dry Contact

INPUT / OUTPUT

C1 Call & Light FL 1
C2 Call & Light FL 2
C3 Call & Light FL 3
C4 Call & Light FL 4

Mfg. By:



Electro-Mech. Industries

250 Hamilton Road, Arlington Heights, IL 60005
Phone (847) 593-4900 Fax (847) 593-1394



RESIDENTIAL CONTROLLERS

Page 4

SELECTOR REQUIREMENTS

The 4M2 series Controllers require seven selector inputs for proper operation:

LU = Level Up	P1 = Verifies Car is at FL 1	P4 = Verifies Car is at FL 4
LD = Level Down	P2 = Verifies Car is at FL 2	
DZ = Door Zone	P3 = Verifies Car is at FL 3	

The inputs are 24VDC active low; meaning that 24VDC Reference must be present at the appropriate controller terminal to turn on the input.

Up Travel Logic Sequence:

- When an up call is registered, the “UP”, “RP” and “HS” computer outputs will be activated.
- Each time UL is activated along with DZ the selector will increment one level
- When the selector increments to the landing where the call is registered, the “HS” computer output will deactivate and the car will continue up the hoistway at leveling speed.
- To stop the car after it is running in leveling speed UL turns off while DZ remains on. The “UP” computer output is deactivated then after 3 seconds “RP” computer output is deactivated.

Down Travel Logic Sequence:

- When a down call is registered, the “DN”, “RP” and “HS” computer outputs will be activated.
- Each time DL is activated along with DZ the selector will decrement one level
- When the selector decrements to the landing where the call is registered, the “HS” computer output will deactivate and the car will continue down the hoistway at leveling speed.
- To stop the car after it is running in leveling speed DL turns off while DZ remains on. The “DN” computer output is deactivated then after 3 seconds “RP” computer output is deactivated.

Releveling (Hydro Only)

After the car has stopped at floor level in response to a call, the car will re-level up when UL and DZ are on together, and will stop when LU is off. The car will re-level down if DL and DZ are on together, and will stop when DL is off. Releveling is deactivated for single speed and VVVF winding drums.

Positive Encoding:

The MHTAL Controller board achieves positive encoding via four independent positioning magnets. Door Lock outputs will be activated only when proper position magnet is present.

Short Floors: The minimum travel distances are as follows:

Automatic PB: 12 inches.

Constant Pressure: 24 inches.

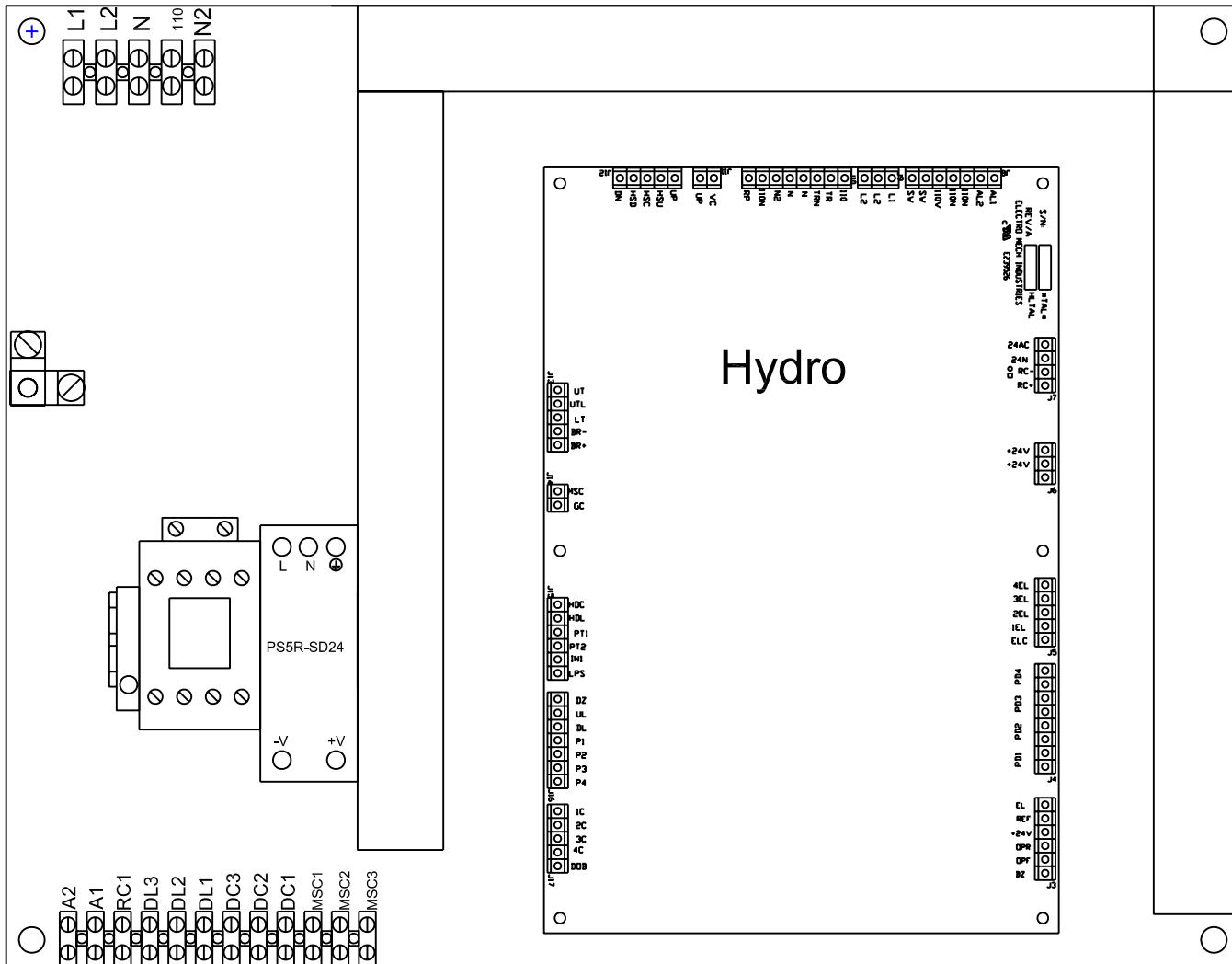
Mfg. By:



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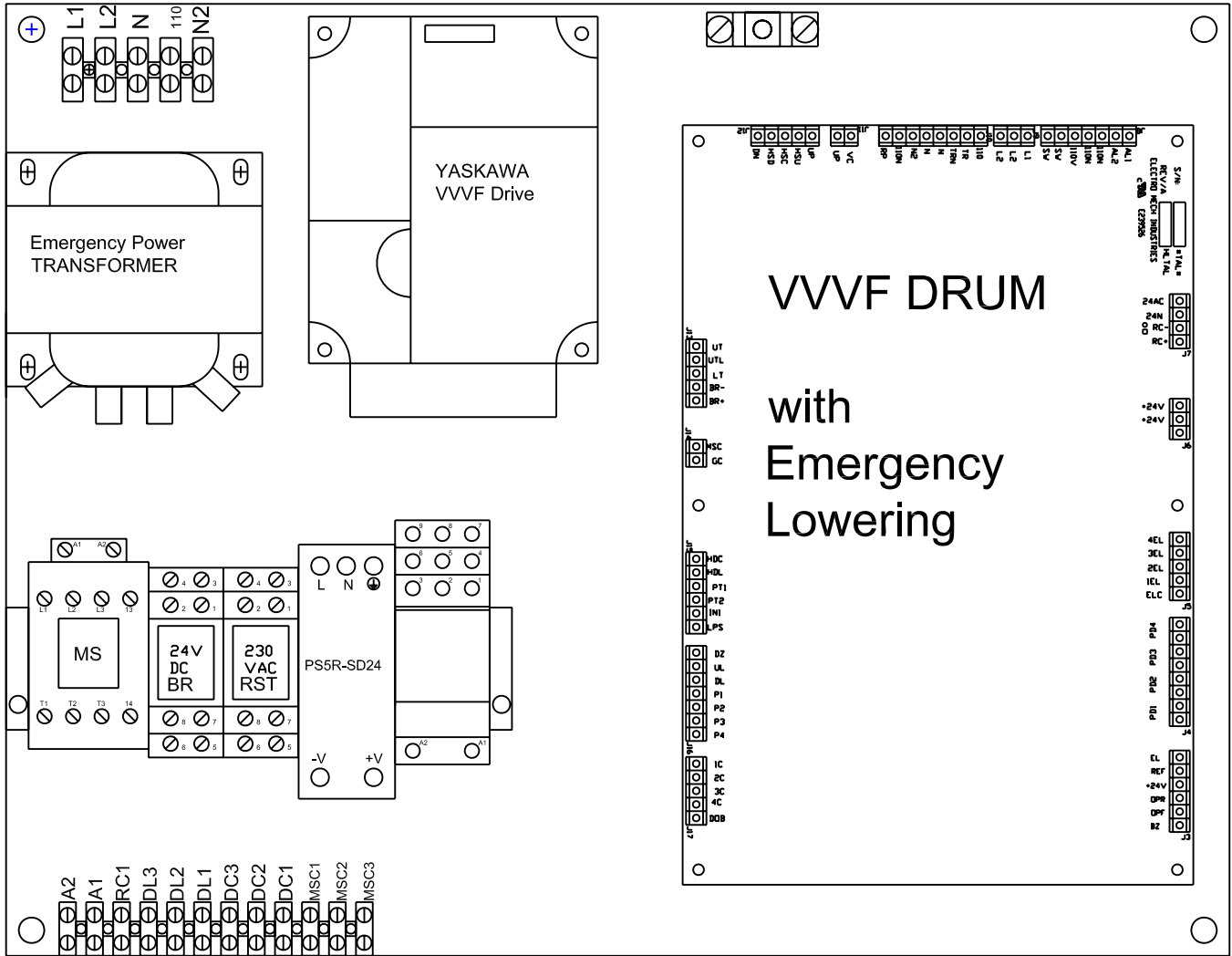


UPS 425VA

Size = 20" x 20" x 6 3/4"

Model#: 4M2H2
Controller Layout

DWG DATE: 08-01-13	PAGE 1 OF 1
Electro-Mech Industries Arlington Hts., IL 60005	Ph: (847)593-4900 Fax: (847)593-1394

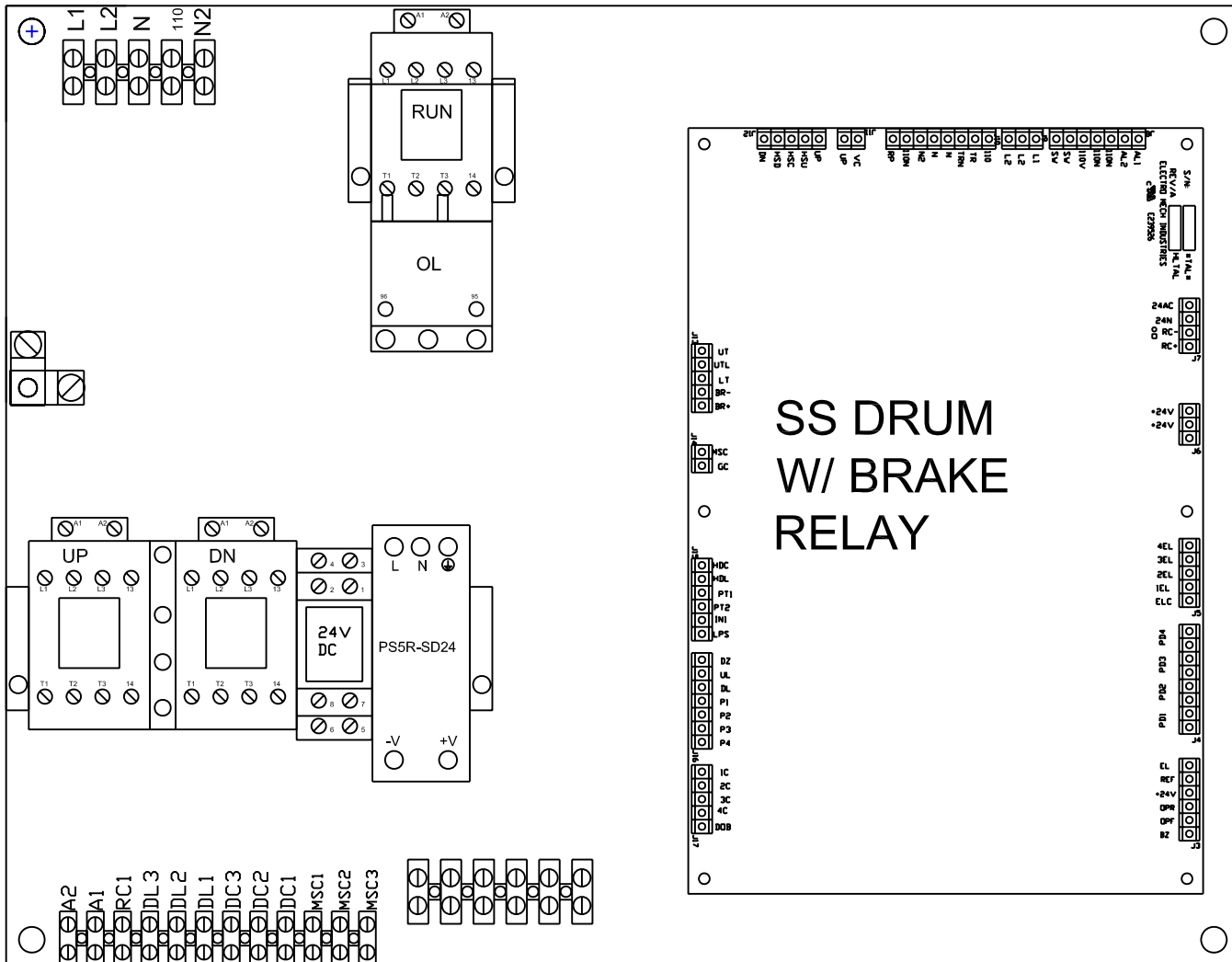


UPS 800VA (Min)

Size = 20" x 20" x 6 3/4"

Model#: 4M2VF
Controller Layout

DWG DATE: 08-01-13	PAGE 1 OF 1
Electro-Mech Industries Arlington Hts., IL 60005	Ph: (847)593-4900 Fax: (847)593-1394



Size = 20" x 20" x 6 3/4"

Model#: 4M2SS
Controller Layout

DWG DATE: 08-01-13	PAGE 1 OF 1
Electro-Mech Industries Arlington Hts., IL 60005	Ph: (847)593-4900 Fax: (847)593-1394

LEV RETROFIT CONTROLLERS

Since TKA announced that they would terminate their North American Residential Elevator operations, we have moved forward with providing a LEV retrofit control system to the industry. We will offer control systems for both chain drive and hydraulic LEV's. The controllers will be available for both hoistway and remote installations.

Product Goals:

- Offer a cost effective solution to changing out a LEV controller without sacrificing any functionality.
- To reuse as much of the existing wiring and ancillary components as possible.
- To complete the retrofit within 4 hours

Features & Benefits:

- Reuse of the following ancillary components
 - Hall Stations
 - COP
 - Selector
 - Automatic Gate Operator
 - TKA Temp Run Pendant (to run car only)
- Reuse of all CAT-5 cables
- Reuse all wire harnesses with pluggable Terminal strips as is

Retrofit Limitations:

- Larger Controller cabinet (non-hoistway mounted H=20.5" x W=24.5" x D=6.8")
- 4 Stops Maximum
- No fault codes to hall stations

Installation Overview (non Hoistway installation):

1. Un-plug all connectors to original controller & remove controller
2. Mount Retrofit controller
 - Re-pipe incoming power from disconnect
 - Plug in all original connectors to Retrofit Controller
3. Un-plug all connectors to original COP Interface PCB & remove
4. Install Retrofit COP Interface PCB (Same mounting points)
5. Plug in all original connectors to Retrofit COP Interface PCB
6. Reposition Selector magnets
7. Program Job specific parameter to controller
8. Return car to service

Mfg. By:



Electro-Mech. Industries

250 Hamilton Road, Arlington Heights, IL 60005
Phone (847) 593-4900 Fax (847) 593-1394



Required Selector Signals 4M2 Controller Series

RUNNING UP							
CAR LOCATION	DZ	UL	DL	P1	P2	P3	P4
@ FL 1	X			X			
	X		X	X			
	X		X	O			
	O		X				
ALL OFF			O				
		X					
	X	X					
	X	X			X		
@ FL2	X	O			X		
	X		X		X		
	X		X		O		
	O		X				
ALL OFF			O				
		X					
	X	X					
	X	X				X	
@ FL 3	X	O				X	
	X		X			X	
	X		X			O	
	O		X				
ALL OFF			O				
		X					
	X	X					
	X	X					X
@ FL 4	X	O					X

X= LED ON
O= LED HAS TURNED OFF

RUNNING DOWN							
CAR LOCATION	DZ	UL	DL	P1	P2	P3	P4
@ FL 4	X						X
	X	X					X
	X	X					O
	O	X					
ALL OFF		O					
			X				
	X		X				
	X		X			X	
@ FL 3	X		O			X	
	X	X				X	
	X	X				O	
	O	X					
ALL OFF		O					
			X				
	X		X				
	X		X		X		
@ FL 2	X		O		X		
	X	X			X		
	X	X			O		
	O	X					
ALL OFF		O					
			X				
	X		X				
	X		X	X			
@ FL 1	X		O	X			

X= LED ON
O= LED HAS TURNED OFF

Selector Logic Requirements Rev 1

The MHTAL Controller board requires seven selector inputs for proper operation:

LU = Level Up	P1 = Verifies Car is at Position 1	P4 = Verifies Car is at Position 4
LD = Level Down	P2 = Verifies Car is at Position 2	
DZ = Door Zone	P3 = Verifies Car is at Position 3	

The inputs are 24VDC active low; meaning that 24VDC Reference must be present at the appropriate controller terminal to turn on the input.

Up Travel Logic Sequence:

- When an up call is registered, the “UP”, “RP” and “HS” computer outputs will be activated.
- Each time **UL** is activated along with **DZ** the selector will increment one level
- When the selector increments to the landing where the call is registered, the “HS” computer output will deactivate and the car will continue up the hoistway at leveling speed.
- To stop the car after it is running in leveling speed **UL** turns off while **DZ** remains on. The “UP” computer output is deactivated then after 3 seconds “RP” computer output is deactivated.

Down Travel Logic Sequence:

- When a down call is registered, the “DN”, “RP” and “HS” computer outputs will be activated.
- Each time **DL** is activated along with **DZ** the selector will decrement one level
- When the selector decrements to the landing where the call is registered, the “HS” computer output will deactivate and the car will continue down the hoistway at leveling speed.
- To stop the car after it is running in leveling speed **DL** turns off while **DZ** remains on. The “DN” computer output is deactivated then after 3 seconds “RP” computer output is deactivated.

Releveling (Hydro Only)

After the car has stopped at floor level in response to a call, the car will re-level up when **UL** and **DZ** are on together, and will stop when **LU** is off. The car will re-level down if **DL** and **DZ** are on together, and will stop when **DL** is off. Releveling is deactivated for single speed and VVVF winding drums.

Positive Encoding:

The MHTAL Controller board achieves positive encoding via four independent positioning magnets. Door Lock outputs will be activated only when a positioning magnet is present.

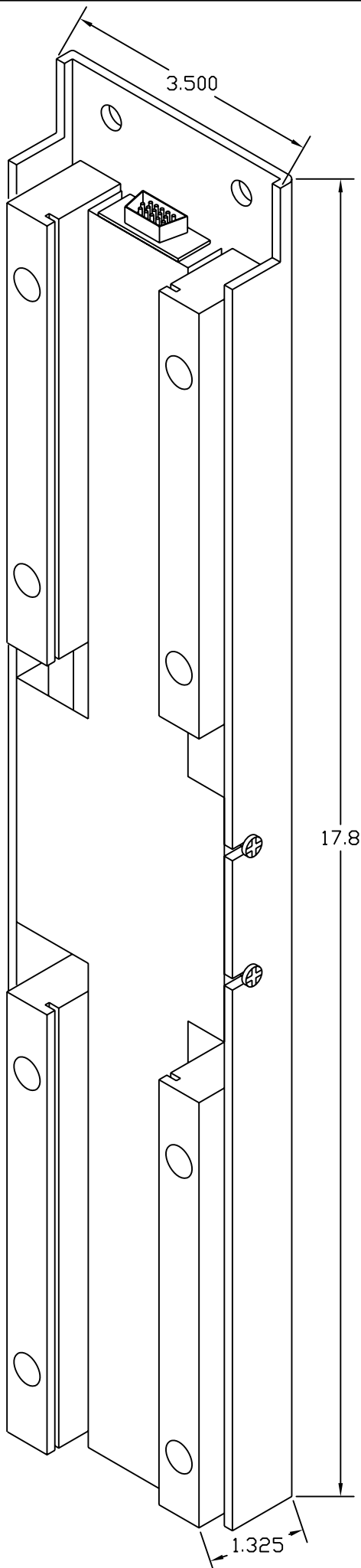
Short Floors: The minimum travel distance is 12 inches.

Short Floor Up Logic Sequence from floor A to floor B:

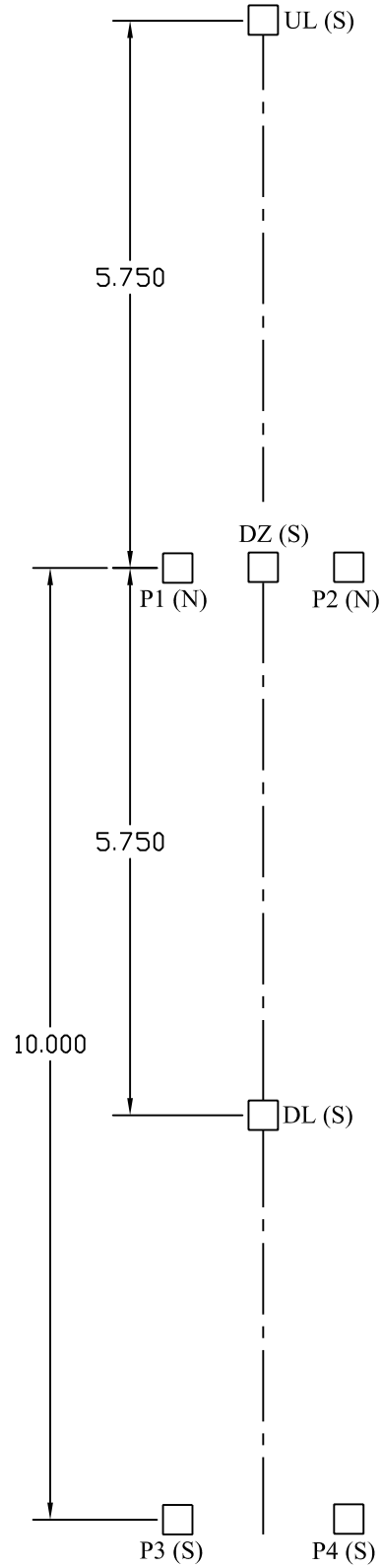
- When an up call is registered, the “UP” and “RP” computer outputs will be activated.
- Before the car moves the computer will have the following signals from the selector: **DZ** on, **PA** on.
- Once the car moves away from floor A, the computer will see the following selector signals:
 - **DL** on, **UL** on, **PA** off, **DZ** off, **DZ** on, **PB** on, **DL** off then **UL** off.
- Stop the car when **UL** turns off. The “UP” computer output is deactivated then after 3 seconds “RP” computer output is deactivated.

Short Floor Down Logic Sequence from floor B to floor A:

- When a down call is registered, the “DN” and “RP” computer outputs will be activated.
- Before the car moves the computer will have the following signals from the selector: **DZ** on, **PB** on.
- Once the car moves away from floor B, the computer will see the following selector signals:
 - **UL** on, **DL** on, **PB** off, **DZ** off, **DZ** on, **PA** on, **UL** off then **DL** off.
- Stop the car when **DL** turns off. The “DN” computer output is deactivated then after 3 seconds “RP” computer output is deactivated.



SENSOR SPACING



Electro Mech Industries, Inc.

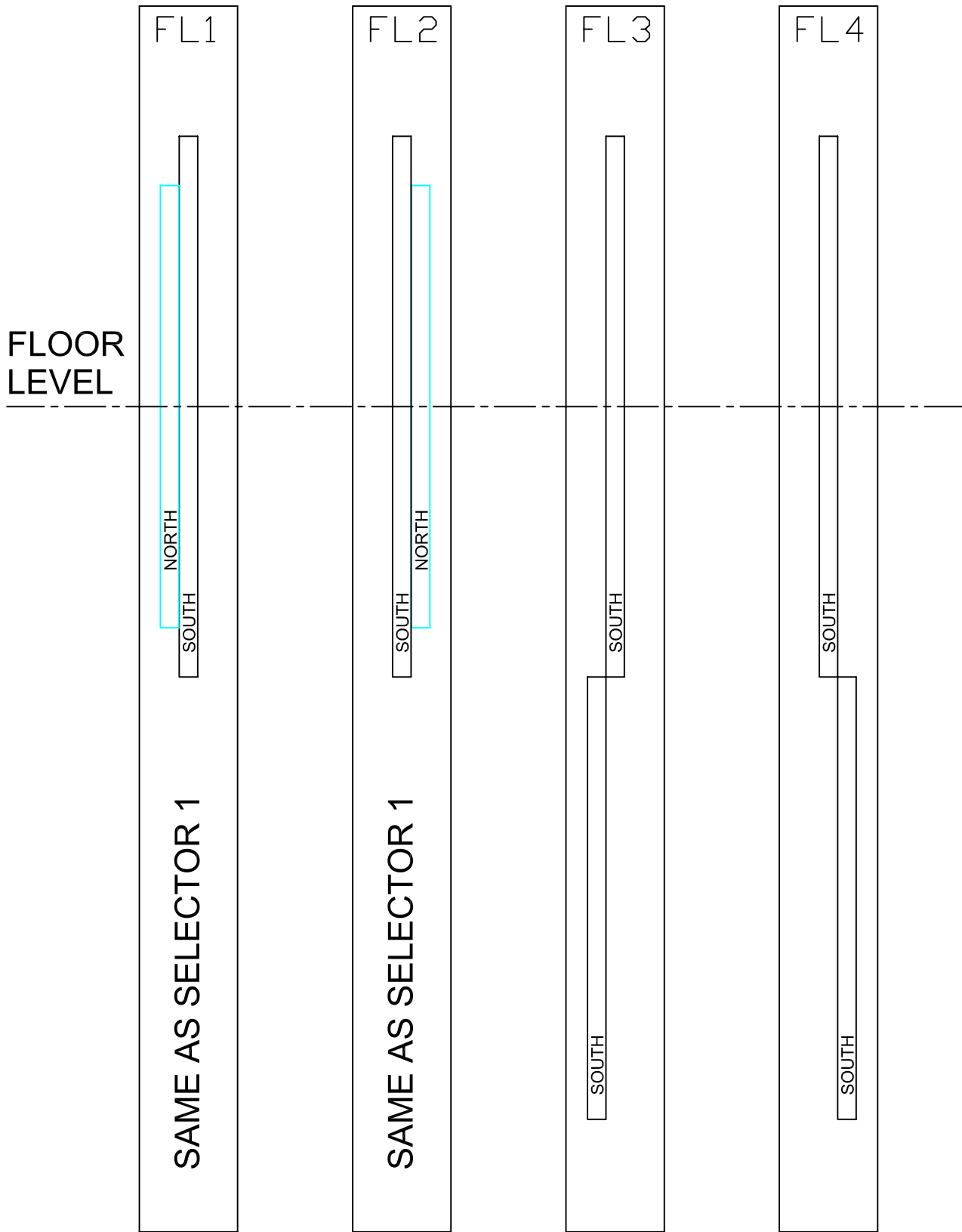
SIZE	FSCM NO.	DWG NO.	REV
A		SEL2	

SCALE: None

SHEET

SELECTOR 2

MAGNET CONFIGURATIONS



After magnets are positioned, trim as necessary to avoid a "yo-yo" effect during arrival to a floor.

Terminal & Final Limit Switch Kit

INSTALLATION INSTRUCTIONS

Part Number: LECLIMSWKITUFL

Kit Contains:

- 1- Switch Bracket w/ 3 pre-wired switches
- 2- Left handed Cams & Securing Plates
- 1- Right handed Cam & Securing Plate
- 6- 10-32 Screws
- 2- #10 Self tapping Screws

Installation Procedure:

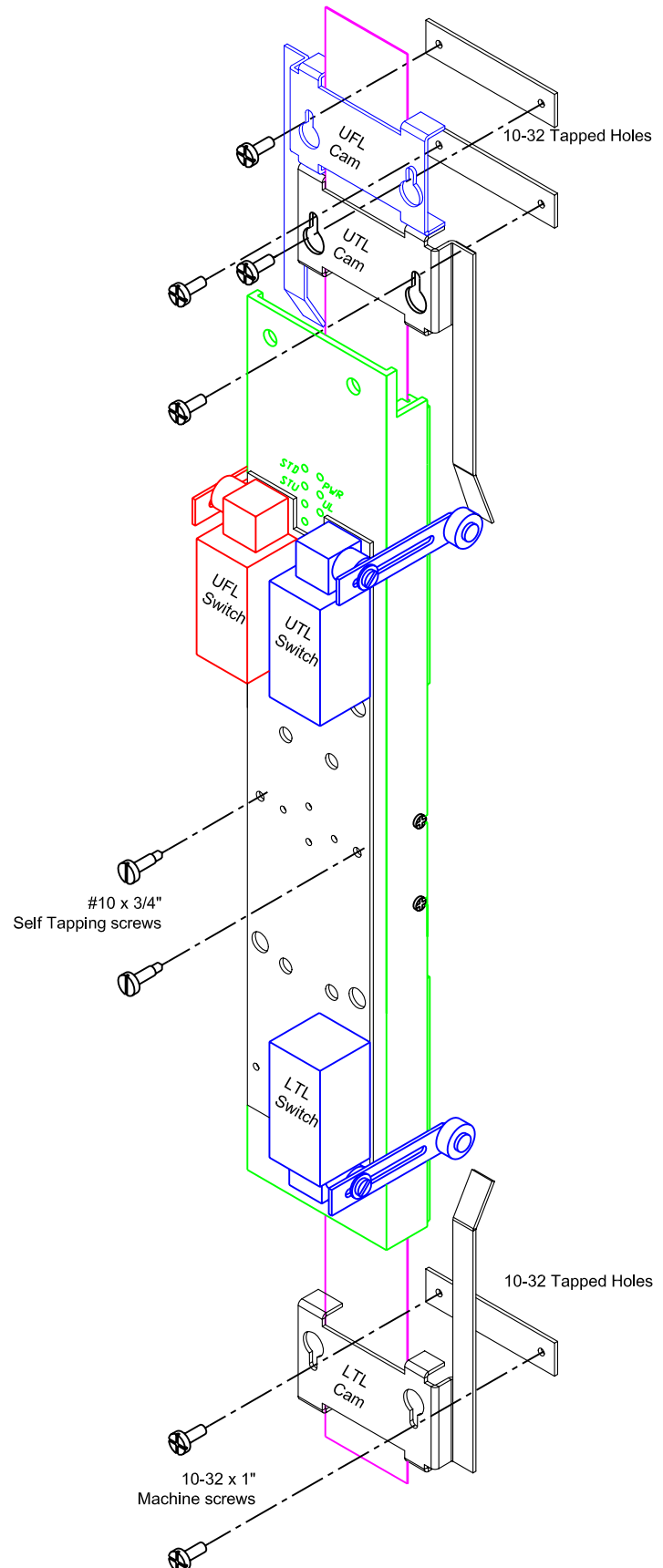
- 1. Secure Switch Bracket to Selector Head using #10 Self Tapping Screws
- 2. Rotate Switch arms 90 degrees towards back of Selector Head
- 3. Secure LTL Cam to 2" tape using 10-32 Screws
- 4. Secure UTL Cam to 2" tape using 10-32 Screws
- 5. Secure UFL Cam above UTL Cam using 10-32 Screws

Wire Color Codes:

UTL: RED (UPPER TERM. LIMIT)
LTL: YEL (LOWER TERM. LIMIT)
TLC: BLK (TERM. LIMIT COMMON)
FL1: ORG (FINAL LIMIT)
FL2: ORG (FINAL LIMIT)

Note: Length of all wires is 6 feet

Mfg by: Electro Mech Industries, Inc.
2420 Hamilton Road
Arlington Heights, IL 60005
Ph: 847-593-4900 : Fax: 847-593-1394



Residential Controller Accesories

Car Top Boxes

- * Available in five standard configurations
- * Available to accept Porta's Plug & Play CT PCB
- * Compact size: 10" x 12"
- * Material: 18 Ga. (0.052") Steel
- * Finish: Grey Powder Coating
- * Eight Knock Outs (0.89" dia.)
- * Two Triple Knock Outs (0.89", 1.38" & 1.76" dia.)

Part Numbers & Descriptions:

Part Number	Legend		T. Strips	Alarm Buzzer	Selector Interface PCB	EM Stop Switch
	STD	P & P				
CTB1	X		X			
CTBP1		X	X			
CTB2	X		X	X		
CTBP2		X	X	X		
CTB5	X		X	X	X	
CTBP5		X	X	X	X	
CTB6	X		X	X		X
CTBP6		X	X	X		X
CTB7	X		X	X	X	X
CTBP7		X	X	X	X	X

Drawings:

Standard configuration: Spec # CTB2010-1

Porta Plug & Play configuration: Spec # CTB2010-2



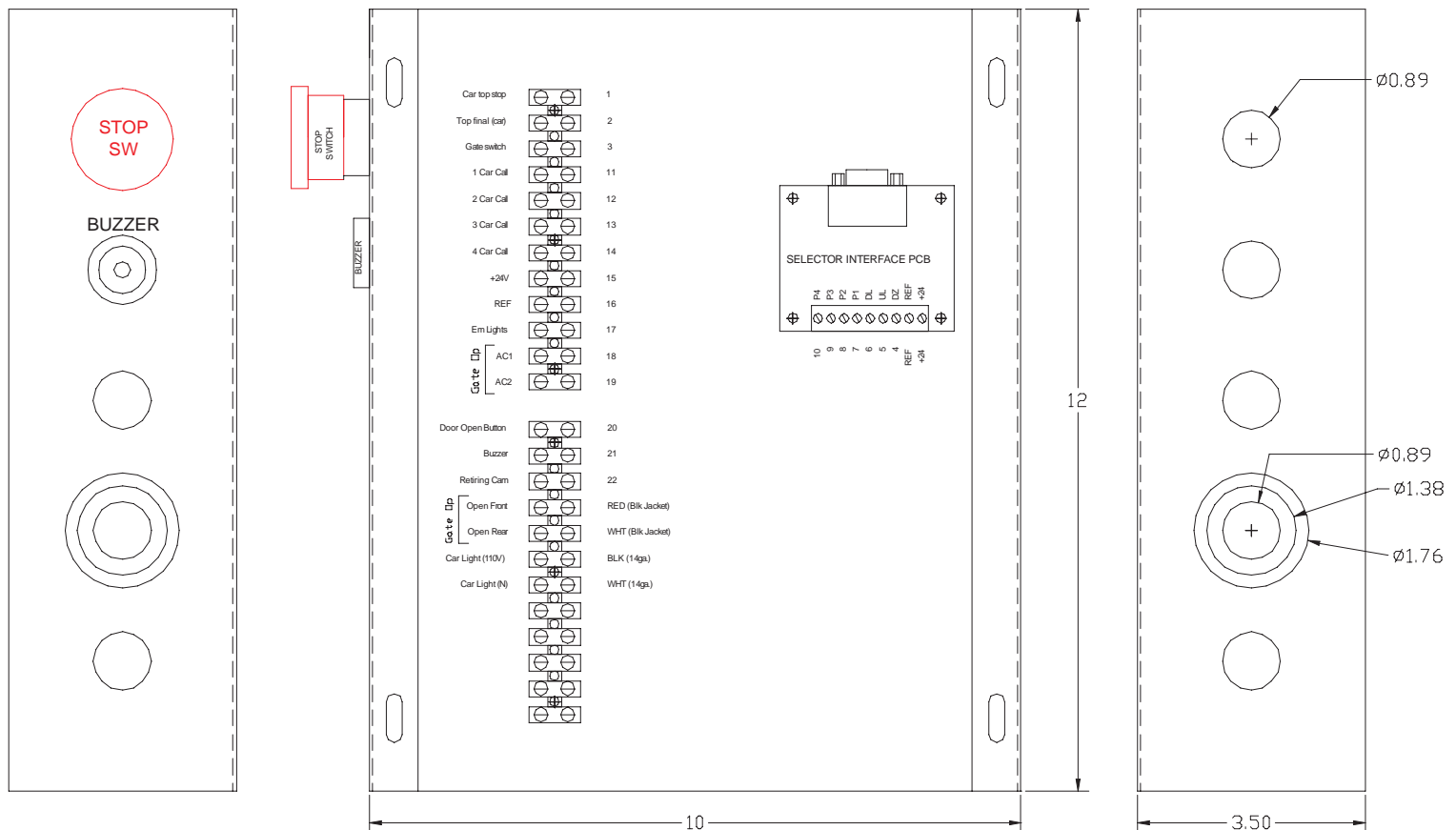
Electro-Mech. Industries

2420 Hamilton Rd., Arlington Heights, IL 60005
Phone (847) 593-4900 Fax (847) 593-1394

SPEC.: CTB2010
DATE: Sept. 2010

Residential Controller Accesories

Car Top Box: Standard Drawing



Item shown is P.N.:CTB7

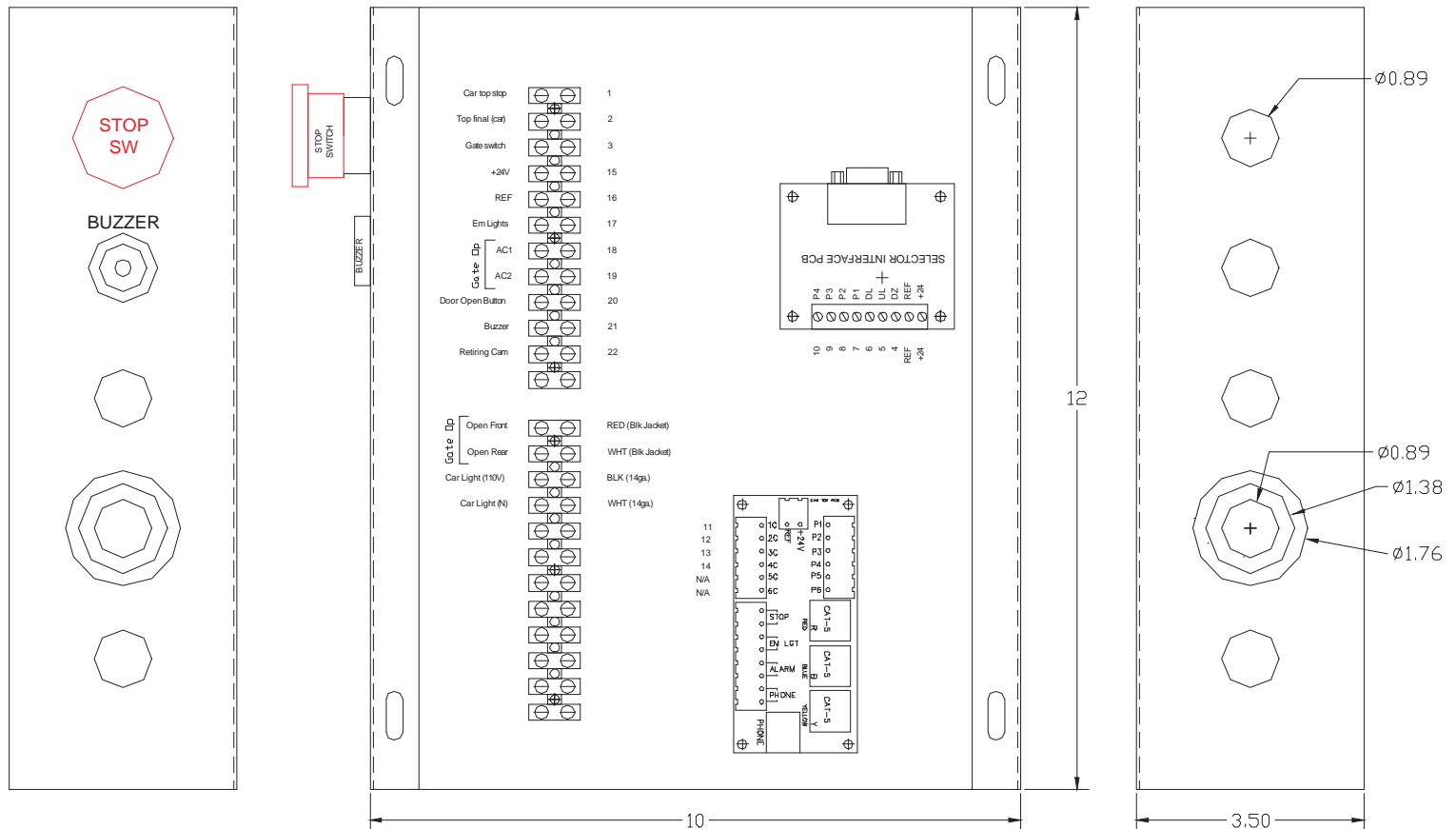


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SPEC.: CTB2010-1
DATE: Sept. 2010

Controller Accesories

Car Top Box: Plug & Play Drawing



Note: Porta's CTPCB is not included with the Car Top Box. This PCB is part of the Plug & Play fixture package.



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SPEC.: CTB2010-1
DATE: Sept. 2010