

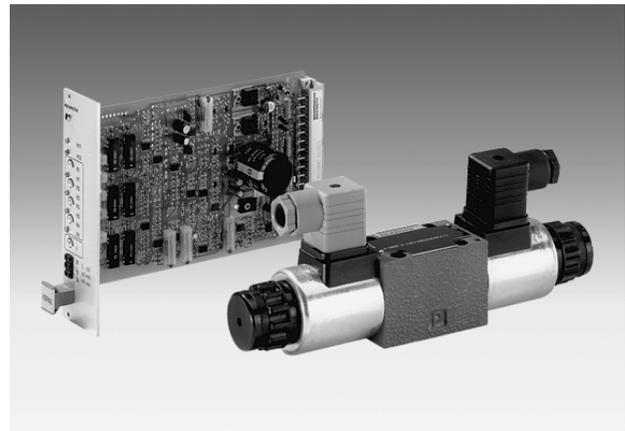
MANNESMANN REXROTH	Proportional pressure reducing valve 3-way design Model 3DREP 6.... and 3DREPE 6...., series 2X			RA 29 184/06.98 Replaces: 10.97
	Size 6	... 1450 PSI (100 bar)	... 4.0 GPM (15 L/min)	

Features:

General

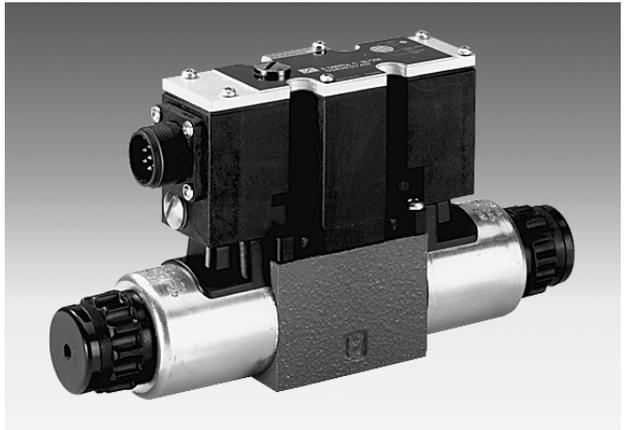
- Direct actuated proportional valve for the control of pressure and direction of flow
- Actuated via proportional solenoids with central thread and removable coil
- For subplate mounting:
porting pattern DIN 24 340 form A, ISO 4401 and CETOP-RP121H, NFPA T3.5.1M R1 and ANSI B93.7 **P 03 (D 03)** sub-plates to catalog sheet RA 45 052 (must be ordered separately, see pages 9 and 11)
- Manual override, optional
- Spring centered control spool
- 3DREPE and 3DREPEB with integrated control electronics
- External electronics for model 3DREP:
 - electrical amplifier model VT-VSPA2-50-1X/... in Euro-card format (must be ordered separately), see pages 4 and 12
 - electrical amplifier model VT 11 011 of modular design (must be ordered separately, see pages 4 and 13)

H/A/D 5735/97



Model 3DREP 6 .2X/...E...
with relevant control electronics (must be ordered separately)

H/A/D 5737/97



Model 3DREPE 6 .2X/...E...

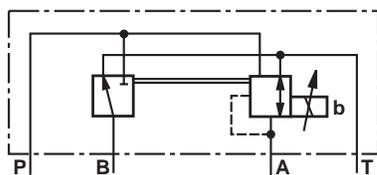
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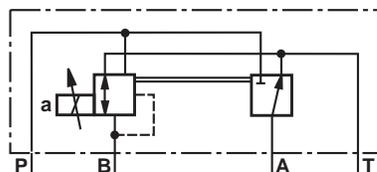
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Electrical connections	5
Integrated control electronics	6 and 7
Characteristic curves	8
Unit dimensions	9 to 11
External control electronics	12 and 13

Symbols

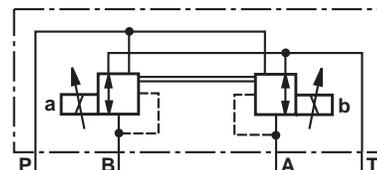
Model 3DREP.. 6 **A** 2X/...E (detailed)



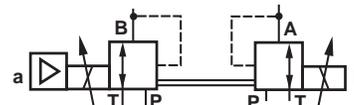
Model 3DREP.. 6 **B** 2X/...E (detailed)



Model 3DREP.. 6 **C** 2X/...E (detailed)



Example for valve with integrated electronics
Model 3DREPE.. 6 **C** 2X/...E (simplified)



Functional description, section

The 3-way pressure reducing valve model 3DREP 6.. is directly actuated by proportional solenoids. They convert an electrical input signal into a proportional pressure output signal.

The proportional solenoids are controllable wet-pin DC solenoids with central thread and removable coil. The solenoids are controlled optionally via external control electronics (model 3DREP) or by integrated control electronics (model 3DREPE[B]).

Design:

The valve is mainly comprised of:

- housing (1) with mounting surface
- control spool (2) with pressure measuring spools (3 and 4)
- solenoids (5 and 6) with central thread
- optional integrated valve electronics (7)

Functional description:

- With the solenoids (5 and 6) de-energized the control spool (2) is held in its center position by springs

- The control spool (2) is directly actuated when one of the solenoids is energized

e.g. by energizing solenoid "a" (5)

→ the pressure measuring spool (3) and control spool (2)

move to the right in proportion to the electrical input signal
 → the connections from P to B and A to T are via orifice cross-sections with progressive flow characteristics

- De-energization of the solenoid (5)

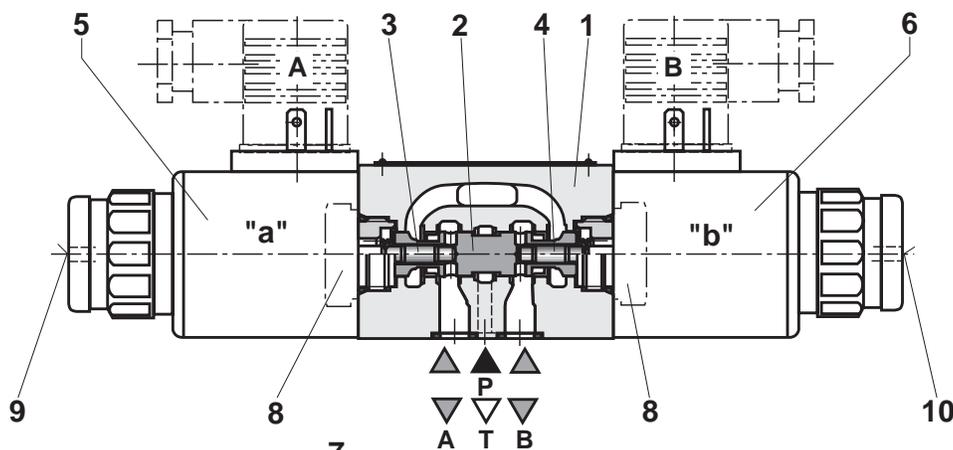
→ the control spool (2) is returned to its center position by the springs

In the middle position the connections A and B to T are open, therefore, the fluid can freely flow to tank. An optional manual override (9 and 10) makes it possible to move the control spool (2) without energizing the solenoid.

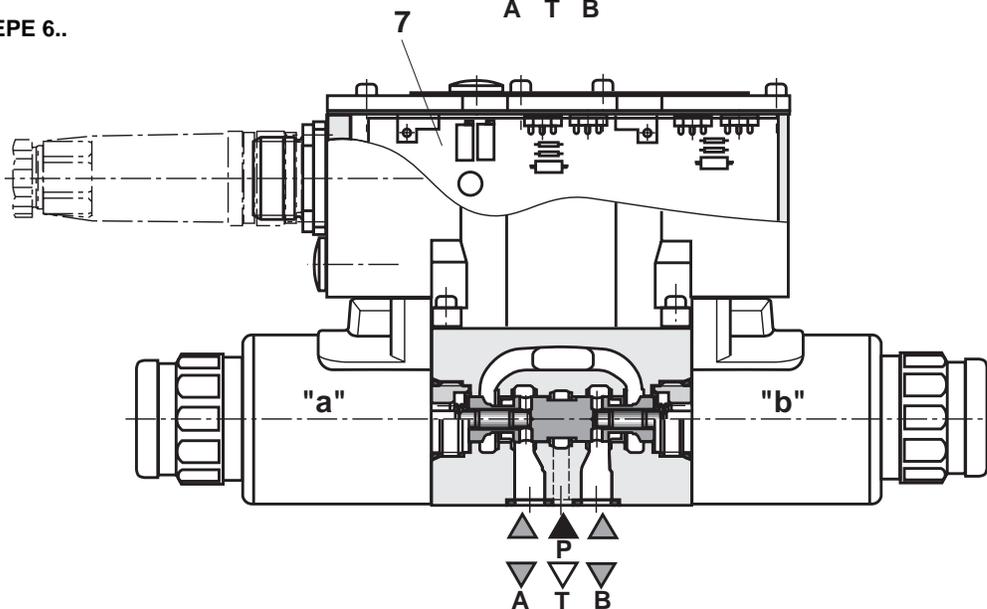
⚠ Attention!

Unintentional use of the manual override can cause uncontrolled machine movement!

Model 3DREP 6..



Model 3DREPE 6..



Valve with 2 switching positions:

(Model 3DREP..A... or 3DREP..B...)

The function of the version of the valve is basically the same as that of the valve with 3 switching positions. The 2 position valves are however only fitted with either solenoid "a" (5) or solenoid "b" (6). A plug (8) is fitted in place of the second solenoid.

Note:

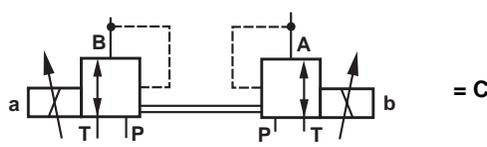
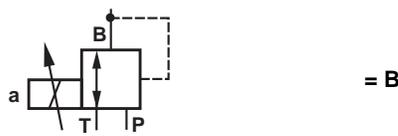
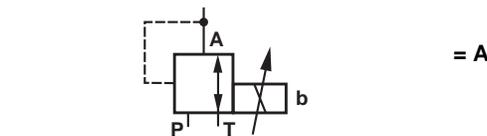
Emptying of the tank line should be prevented. A suitable check valve can be fitted in the tank line [approx. 30 PSI (2 bar)].

Ordering details

3DREP		6		2X /	E	G24		/	V	*
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Without integrated control electronics = **No code**
With integrated control electronics (standard electronics) = **E**
With integrated control electronics (simple electronics) = **EB**
 Nominal size 6 = **6**

Symbols (simplified)



Series 20 to 29 (20 to 29: unchanged installation and connection dimensions) = **2X**

Pressure stage 232 PSI (16 bar) = **16**
 Pressure stage 362.6 PSI (25 bar) = **25**
 Pressure stage 652.7 PSI (45 bar) = **45**

Further details in clear text
V = FPM seals, suitable for mineral oilS (HL, HLP) to DIN 51 524

For 3DREPE and 3DREPEB
A1 = command value input ±10 V
Only for 3DREPE
F1 = command valve input 4 tp 20 mA

Electrical connections for DREP
K4 =¹⁾ with component plug to DIN 43 650-AM2 **without** plug-in connector plug-in connector - separate order under material no. **RR00 074 683** (valve side a) and material no. **RR00 074 684** (valve side b)
For DREPE and DREPEB
K31 =¹⁾ with component plug to E DIN 43 563-AM6-3 **without** plug-in connector plug-in connector - separate order under material no. **RR00 021 267**

No code = without special protection
J = sea water resistant

No code = without manual override
N9 =²⁾ with protected manual override

Power supply for the control electronics
G24 = 24 V DC

E = proportional solenoid with removable coil

1) For version "J" = sea water resistant only "K31"
 2) For version "J" = "N" instead of "N9"

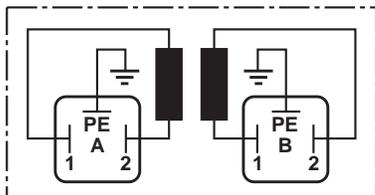


Technical data (for applications outside these parameters, please consult us!)					
General					
Valve model			DREP	DREPE	DREPEB
Installation	optional, preferably horizontal				
Storage temperature range	°F (°C)	- 4 to + 176 (- 20 to + 80)			
Ambient temperature range	°F (°C)	-4 to +158 (-20 to +70)	-4 to +122 (-20 to +50)	-4 to +122 (-20 to +50)	
Weight	lbs (kg)	4.4 (2.0)	4.84 (2.2)	4.84 (2.2)	
Hydraulic					
Operating pressure range	Port P	PSI (bar)	290 to 1450 (20 to 100) for pressure stage 16		
		PSI (bar)	435 to 1450 (30 to 100) for pressure stage 25		
		PSI (bar)	725 to 1450 (50 to 100) for pressure stage 45		
	Port T	PSI (bar)	0 to 435 (0 to 30)		
Max. flow		GPM (L/min)	4.0 (15) ($\Delta p = 725$ PSI (50 bar))		
Pressure fluid	Mineral oil (HL, HLP) DIN 51 524				
	Further fluids on request!				
Pressure fluid temperature range	°F (°C)	-4 to + 176 (- 20 to + 80) (preferably + 104 to + 122 (+ 40 to + 50))			
Viscosity range	SUS (mm ² /s)	97 to 1760 (20 to 380) (preferably 141 to 215 (30 to 46))			
Degree of contamination	Maximum permissible degree of contamination of the pressure fluid is to NAS 1638 class 9. We, therefore, recommend a filter with a minimum retention rate of $\beta_{10} \geq 75$ without bypass valve, if possible directly in front of the proportional valve.				
Hysteresis	%	≤ 5			
Repeatability accuracy	%	≤ 1			
Response sensitivity	%	≤ 0.5			
Reversal span	%	≤ 1			
Electrical					
Valve model			DREP	DREPE	DREPEB
Valve protection to DIN 40 050	IP 65				
Voltage model	DC				
Signal model	analog				
Command value signal	Voltage input "A1"	V	—	± 10	± 10
	Current input "F1"	mA	—	4 to 20	—
Max. current per solenoid		A	1.5	2.5	1.5
Solenoid coil resistance	Cold value at 20 °C	Ω	4.8	2	4.8
	Max. warm value	Ω	7.2	3	7.2
Duty	%	100			
Coil temperature	°F (°C)	up to 302 (150)			
Electrical connections	DREP	with component plug to DIN 43 650-AM2 plug-in connector to DIN 43 650-AF2/Pg11 ¹⁾			
	DREPE and DREPEB	with component plug to E DIN 43 563-AM6-3 plug-in connector to E DIN 43 563-BF6-3/Pg11 ¹⁾			
Supply voltage DREPE, DREPEB	Nominal voltage	VDC	24		
	Lower limiting value	V	19		
	Upper limiting value	V	35		
Amplifier current	I_{max}	A	—	1.8	1.5
Consumption	Impulse current	A	—	4	2
Control electronics	For DREP (seperate order) Amplifier in Eurocard format				
	– with 1 ramp time		VT-VSPA2-50-1X/T1 see page 12 or RA 30 113		
	– with 5 ramp times		VT-VSPA2-50-1X/T5 see page 12 or RA 30 113		
	Amplifier of modular design		VT 11 011-1X/... see page 13 or RA 29 737		
For DREPE und DREPEB		integrated into valve, see pages 6 and 7			
¹⁾ Separate order: see pages 3 and 5					
Note: For details regarding the environmental simulation test covering EMC (electro-magnetic compatibility), climate and mechanical loading see RA 29 184-U (declaration regarding environmental compatibility).					

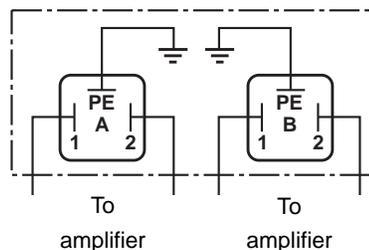
Electrical connections, plug-in connectors: dimensions in inches (millimeters)

For **model 3DREP 6.. (without integrated control electronics)**

Connections at component plug



Connections at plug-in connector



Plug-in connector to DIN 43 650 -AF2

Solenoid **a**, grey, Pg11 (Z4)

material no. **RR00 074 683**

solenoid **b**, black, Pg11 (Z4)

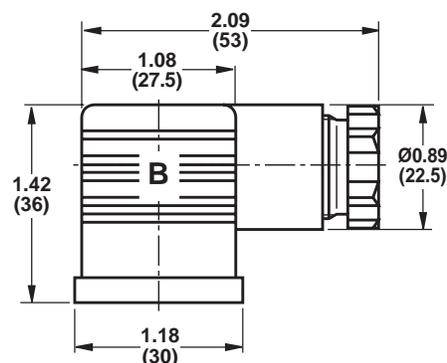
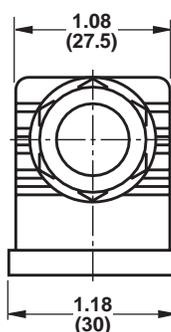
material no. **RR00 074 684**

Solenoid **a**, red-brown, 1/2" NPT (Z45)

material no. **RR00 004 823**

Solenoid **b**, black, 1/2" NPT (Z45)

material no. **RR00 011 039**

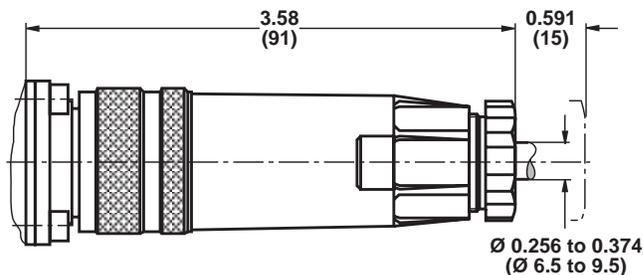
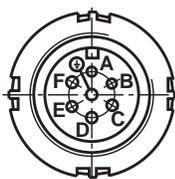


For **model 3DREPE 6 ..., 3DREPEB 6 ... (with integrated control electronics and for version „J“ = sea water resistant)**

Plug-in connector to E DIN 43 563-BF6-3/Pg11

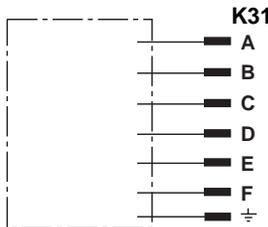
Separate order under material no. **RR00 021 267**

For pin allocation see block circuit diagram on pages 6 and 7



Integrated control electronics for model 3DREPE 6

Plug allocation, component plug



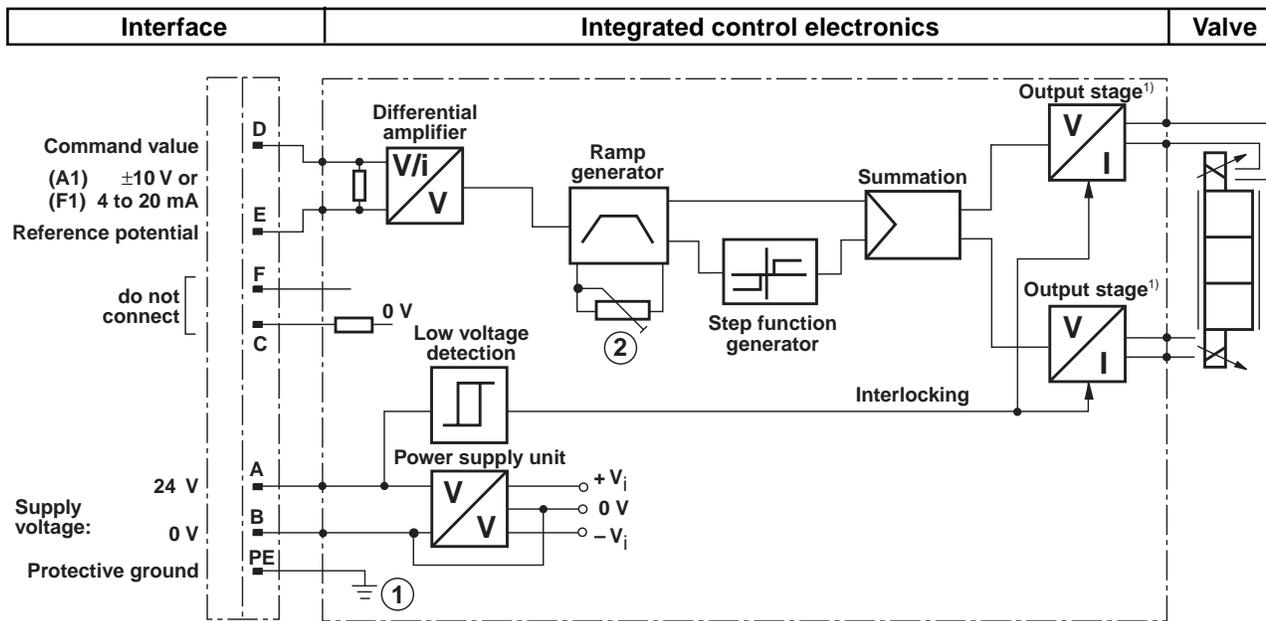
Integrated electronics
(see below)

	Pin	Signal
Supply voltage	A	24 VDC (19 to 35 VDC)
	B	GND
	C	do not connect
Differential input	D	comm. value (± 10 V/4 to 20 mA)
	E	reference potential
	F	do not connect
PE		protective ground

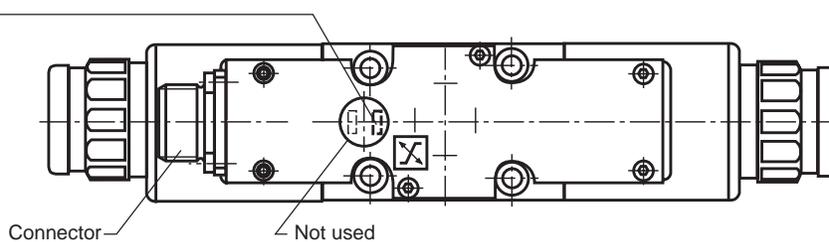
Command value: Positive command value (or 12 to 20 mA) at D and reference potential at E results in pressure in A.
 Negative command value (or 12 to 4 mA) at D and reference potential at E results in pressure in B.
 For a valve with one solenoid on side B (version A) a positive command value at D (4 to 20 mA) and reference potential at E, results in pressure in A. For a valve with one solenoid on side A (version B) a positive command value at D (4 to 20 mA) and reference potential at E, results in pressure in B.

Connection cable: Recommended: – up to 80 ft (25 m) cable length stranded 18 AWG (LiYCY 5 x 0.75 mm²)
 – up to 160 ft (50 m) cable length stranded 16 AWG (LiYCY 5 x 1.0 mm²)
 outside diameter 0.26 to 0.44 in (6.5 to 11.2 mm)
 only attach the shield to earth ground PE on the supply side.

Block circuit diagram / connection allocation for the integrated electronics



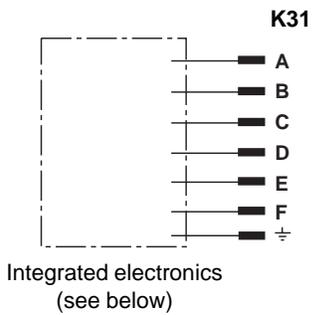
- ① Protective ground attached to valve housing and cover
- ② Ramp can be externally adjusted from 0 to 5 s ($T_{up} \cong T_{down}$)



1) Output stages are current controlled

Integrated control electronics for model 3DREPEB 6

Plug allocation, component plug

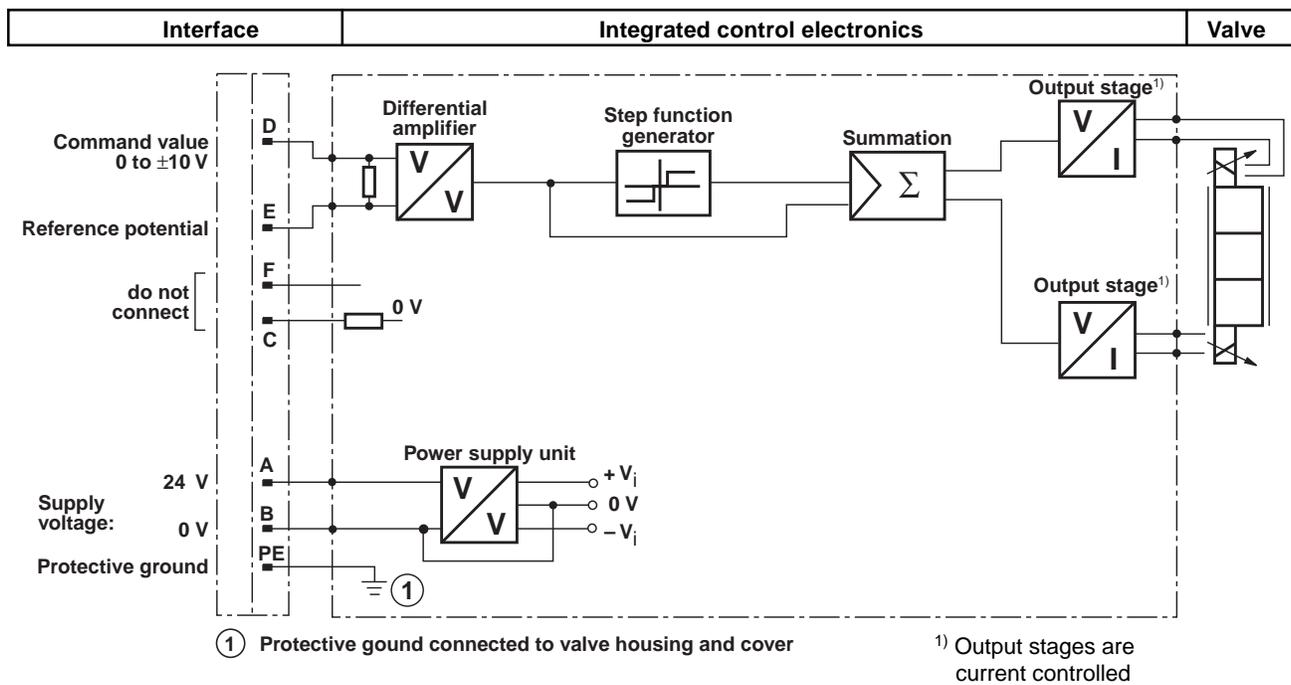


	Pin	Signal
Supply voltage	A	24 VDC (19 to 35 VDC)
	B	GND
	C	do not connect
Differential input	D	comm. value (± 10 V)
	E	reference potential
	F	do not connect
PE		protective ground

Command value: Positive command value at D and reference potential at E results in pressure in A. Negative command value at D and reference potential at E results in pressure in B. For a valve with one solenoid on side b (version A) a positive command value at D and reference potential at E, results pressure in A. For a valve with one solenoid on side a (version B) a positive command value at D and reference potential at E, results in pressure in B.

Connection cable: Recommended:
 – up to 80 ft (25 m) cable length stranded 18 AWG (LiYCY 5 x 0.75 mm²)
 – up to 160 ft (50 m) cable length stranded 16 AWG (LiYCY 5 x 1.0 mm²)
 outside diameter 0.26 to 0.44 in (6.5 to 11.2 mm)
 only attach the shield to earth ground PE on the supply side.

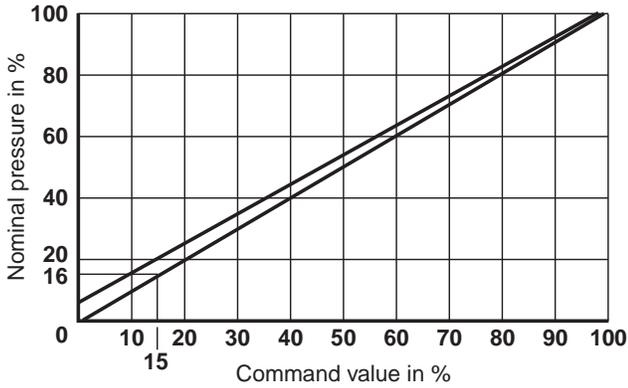
Block circuit diagram / connection allocation for the integrated electronics



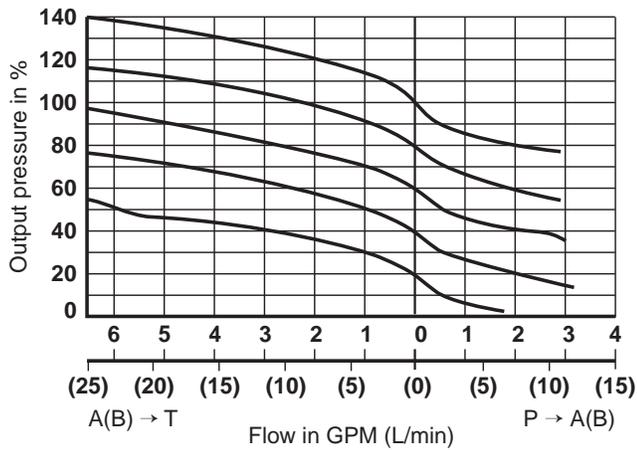
There are no adjustments with the EB electronics

Characteristic curves: measured at $n = 215 \text{ SUS}$ ($46 \text{ mm}^2/\text{s}$) and $J = 104 \text{ }^\circ\text{F}$ ($40 \text{ }^\circ\text{C}$)

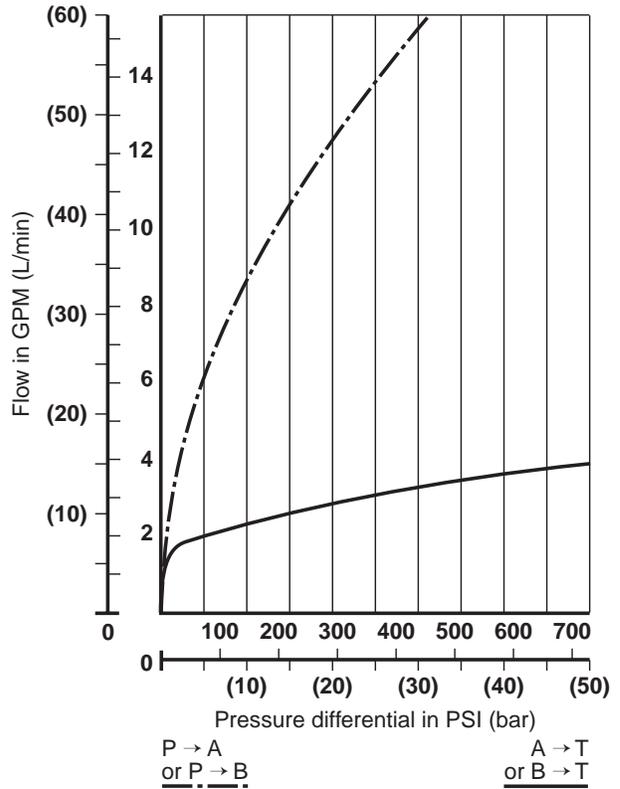
**Pressure stages 230, 360 and 650 PSI
(16, 25 and 45 bar)**



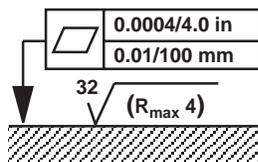
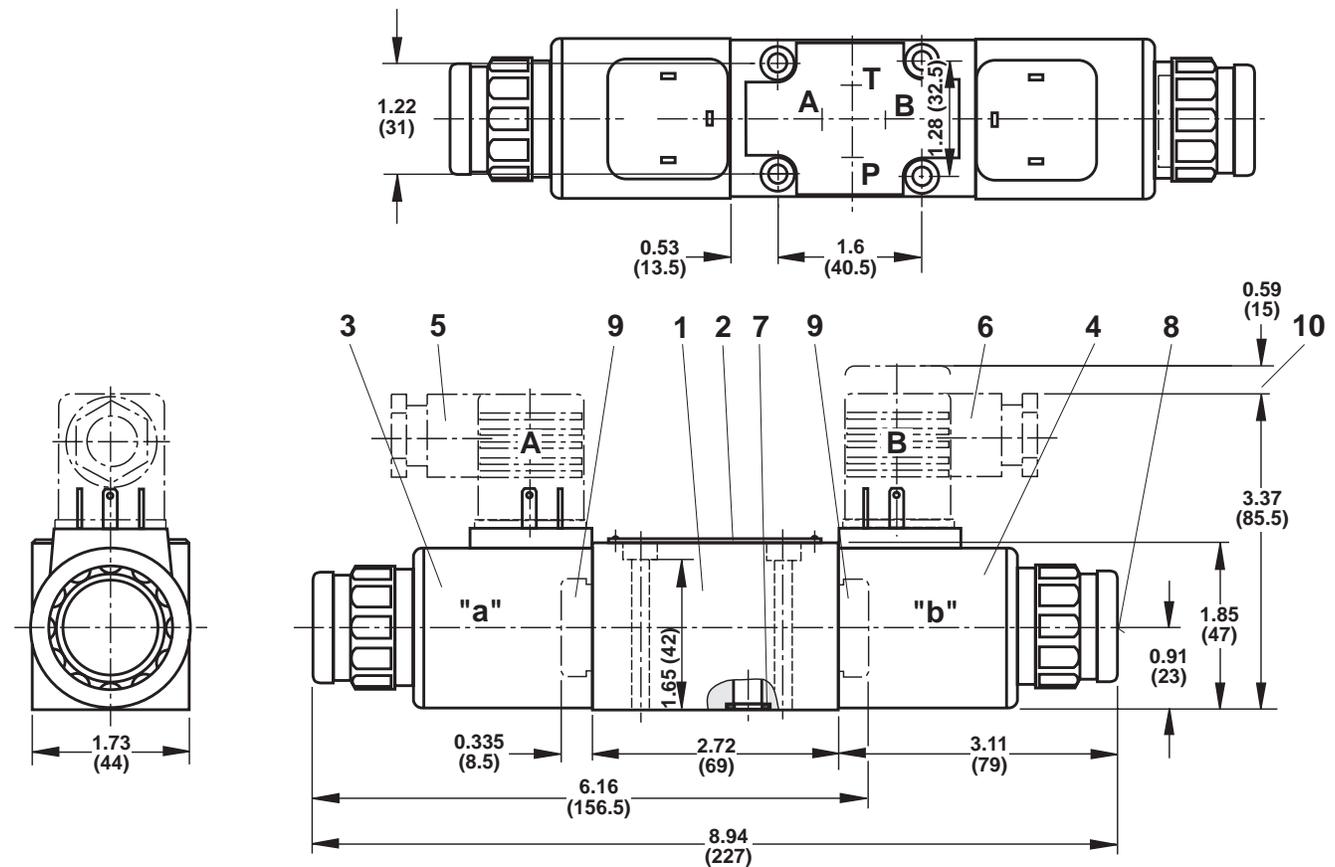
Pressure-flow relationship



**Pressure stages 230, 360 and 650 PSI
(16, 25 and 45 bar)**



Unit dimensions, Model 3DREP 6: dimensions in inches (millimeters)



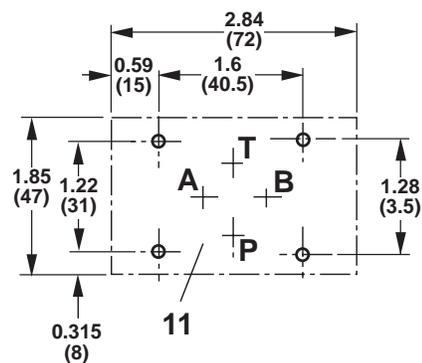
Required surface finish of mating piece

Subplates and valve mounting bolts must be ordered separately, see data sheet RA 45 052.

Subplates G 341/05 (1/4" NPT) G 341/12 (SAE-4; 7/16-20)
 G 342/05 (3/8" NPT) G 342/12 (SAE-6; 9/16-18)
 G 502/05 (1/2" NPT) G 502/12 (SAE-8; 3/4-16)

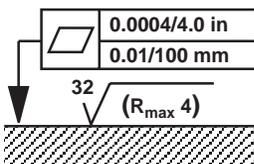
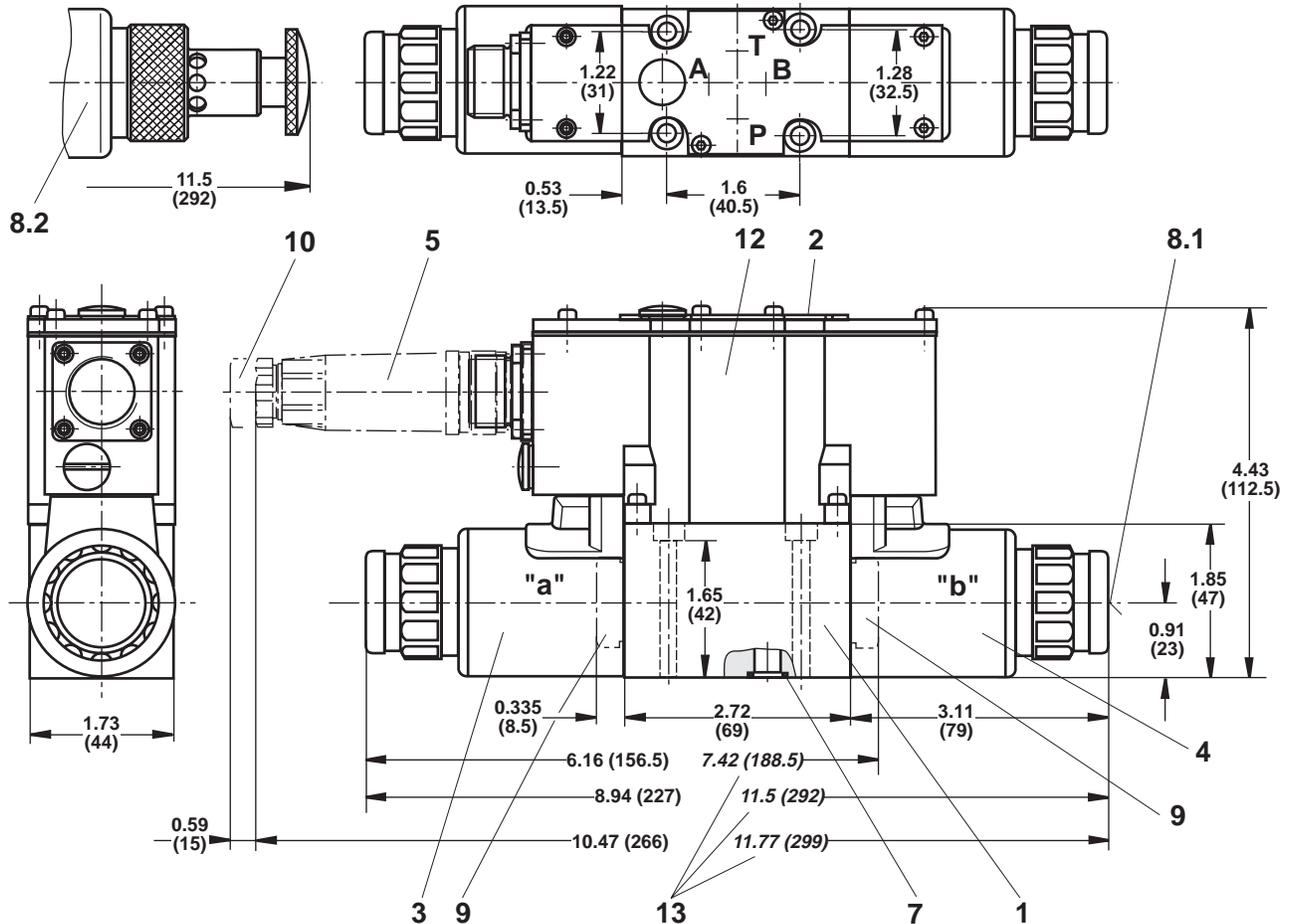
Valve mounting bolts

4) 10-24 UNC x 2" (M5 x 50) DIN 912-10.9; grade 8 or better
 Torque $M_A = 6.56 \text{ lb-ft (8.9 Nm)}$



- | | |
|--|--|
| 1 Valve housing | 7 R-rings (9.81 x 1.5 x 1.78 mm); Ports A, B, P, T |
| 2 Name plate | 8 Protected hand override "N9" |
| 3 Proportional solenoid "a" | 9 Cover for valves with one solenoid (versions "A" or "B") |
| 4 Proportional solenoid "b" | 10 Space required to remove the plug-in connector |
| 5 Plug-in connector "A", color grey (separate order, see pages 3 and 5) | 11 Machined valve mounting face and position of the ports |
| 6 Plug-in connector "B", color black (separate order, see pages 3 and 5) | |

Unit dimensions, Model 3DREPE 6: dimensions in inches (millimeters)



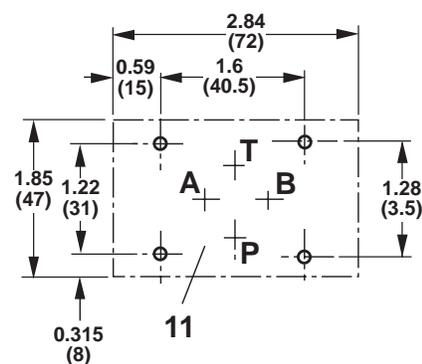
Required surface finish of mating piece

Subplates and valve mounting bolts must be ordered separately, see data sheet RA 45 052.

- Subplates** G 341/05 (1/4" NPT) G 341/12 (SAE-4; 7/16-20)
 G 342/05 (3/8" NPT) G 342/12 (SAE-6; 9/16-18)
 G 502/05 (1/2" NPT) G 502/12 (SAE-8; 3/4-16)

Valve mounting bolts

4) 10-24 UNC x 2" (M5 x 50) DIN 912-10.9; grade 8 or better
 Torque $M_A = 6.56 \text{ lb-ft (8.9 Nm)}$



- | | |
|---|--|
| <ul style="list-style-type: none"> 1 Valve housing 2 Name plate 3 Proportional solenoid "a" 4 Proportional solenoid "b" 5 Plug-in connector to E DIN 43 563-BF6-3/Pg11 (separate order, see pages 3 and 5) 7 R-rings (9.81 x 1.5 x 1.78 mm); Ports A, B, P, T | <ul style="list-style-type: none"> 8.1 Protected hand override "N9" 8.2 Hand override "N" for sea water resistant version "J" 9 Cover for valves with one solenoid (versions "A" or "B") 10 Space required to remove the plug-in connector 11 Machined valve mounting face and positions of the ports 12 Integrated control electronics 13 Dim. for sea water resistant version "J" |
|---|--|

Throttle insert

When used with a proportional directional valve model 4WRZ... then the following throttle inserts are to be used in ports A and B:

Size	10	16	25	32	52
Ø in inches	0.071	0.079	0.11	—	—
Ø in mm	1.8	2.0	2.8	—	—
Material no.	RR00 158 510	RR00 158 547	RR00 157 948	—	—

Control electronics for model 3DREP 6...2X/...: amplifier VT-VSPA2-50 (separate order)

Technical data

Operating voltage V_{DC} : 24 VDC +40% -5%

– upper limiting value $V_{DC(t)max}$: 35 V

– lower limiting value $V_{DC(t)min}$: 22 V

Solenoid current I_{max} : 1.5 A

Clock frequency of the output stage f: 220 Hz ±10%

Card dimensions: Eurocard 3.94 x 6.3 inches (100 x 160 mm)
DIN 41 494

Front plate dimensions

– height: 3 U 5.06 inches (128.4 mm)

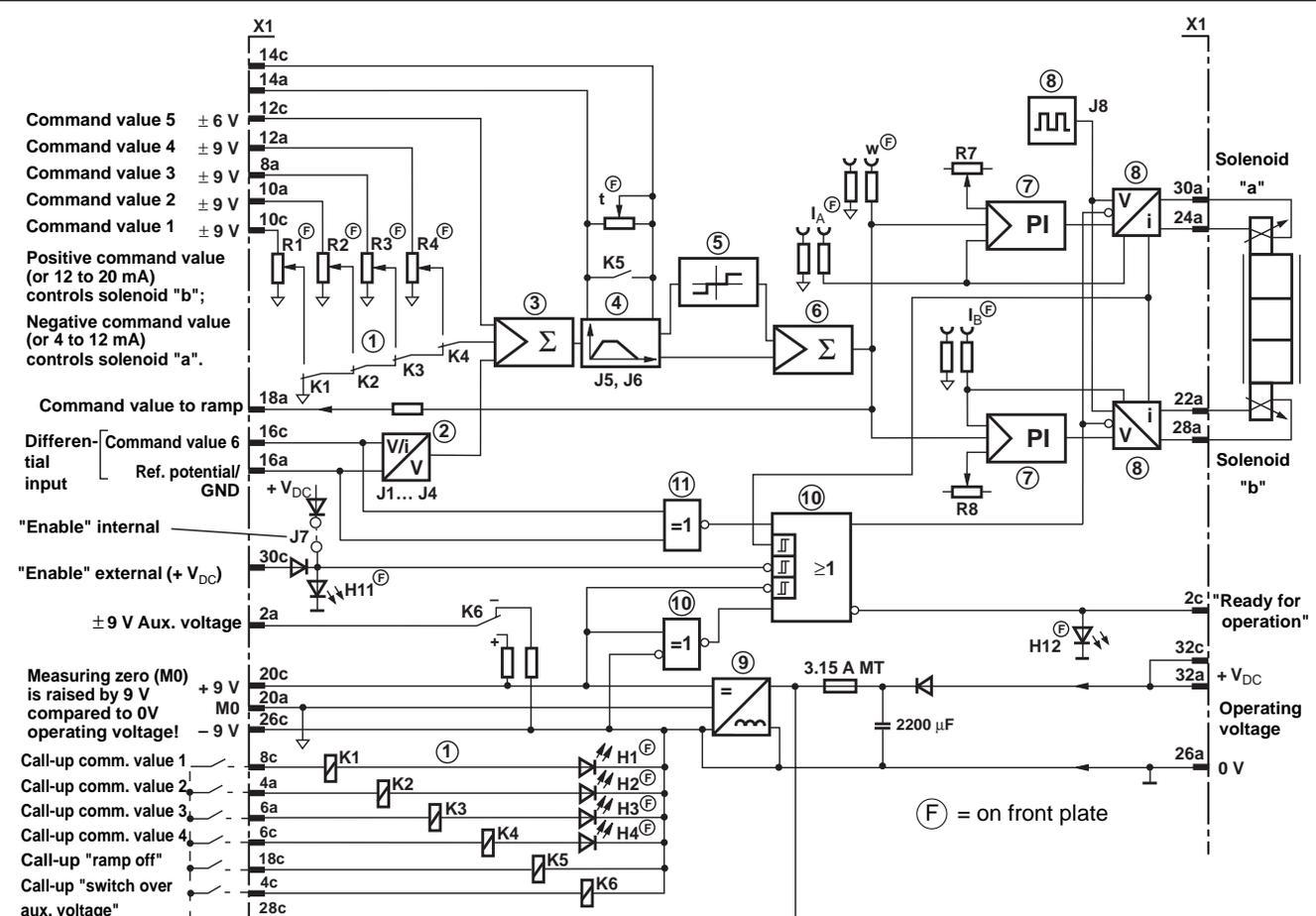
– width soldering side: 1 HP 0.2 inches (5.08 mm)

– width component side: 7 HP

For applications outside these parameters, please consult us!

For detailed information: see catalogue sheet RA 30 113

Block circuit diagram / terminal connection (version with 1 ramp time "T1")



- H1 to H4 = LED displays for command value call-ups
- K1 to K6 = call-up relays
- R1 to R4 = command value
- R7 = bias current solenoid "a"
- R8 = bias current solenoid "b"
- t = ramp time
- 1 Command value
- 2 Differential input
- 3; 6 Summation
- 4 Ramp generator
- 5 Step function
- 7 PI current controller
- 8 Output stage with pulse generator
- 9 Power supply
- 10 Monitoring
- 11 Monitoring cable break (only for 4 to 20 mA)

Ordering details

VT-VSPA2 -50- 1X/ *

Amplifier for controlled proportional valves,
analogue, with 2 output stages

Further details in clear text

Amplifier for proportional valves
3DREP 6 (series 2X) and 4WRZ (series 7X)

= 50

T1 =

1 ramp time

T5 =

5 ramp times

Series 10 to 19

= 1X

(10 to 19: unchanged technical data and connection allocation)



Notes

Empty notes area.



Mannesmann Rexroth Corporation
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Rexroth Hydraulics Div., Mobile, 1700 Old Mansfield Road, Wooster, OH 44691-0394 Tel. (330) 263-3400 Fax: (330) 263-3333