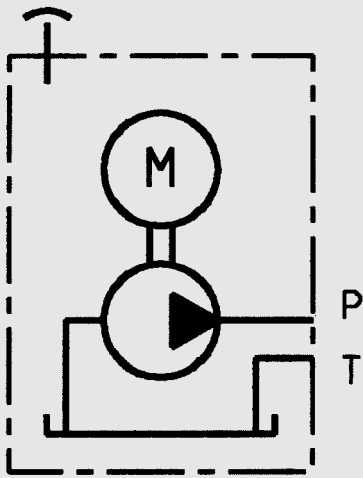


HYDAC

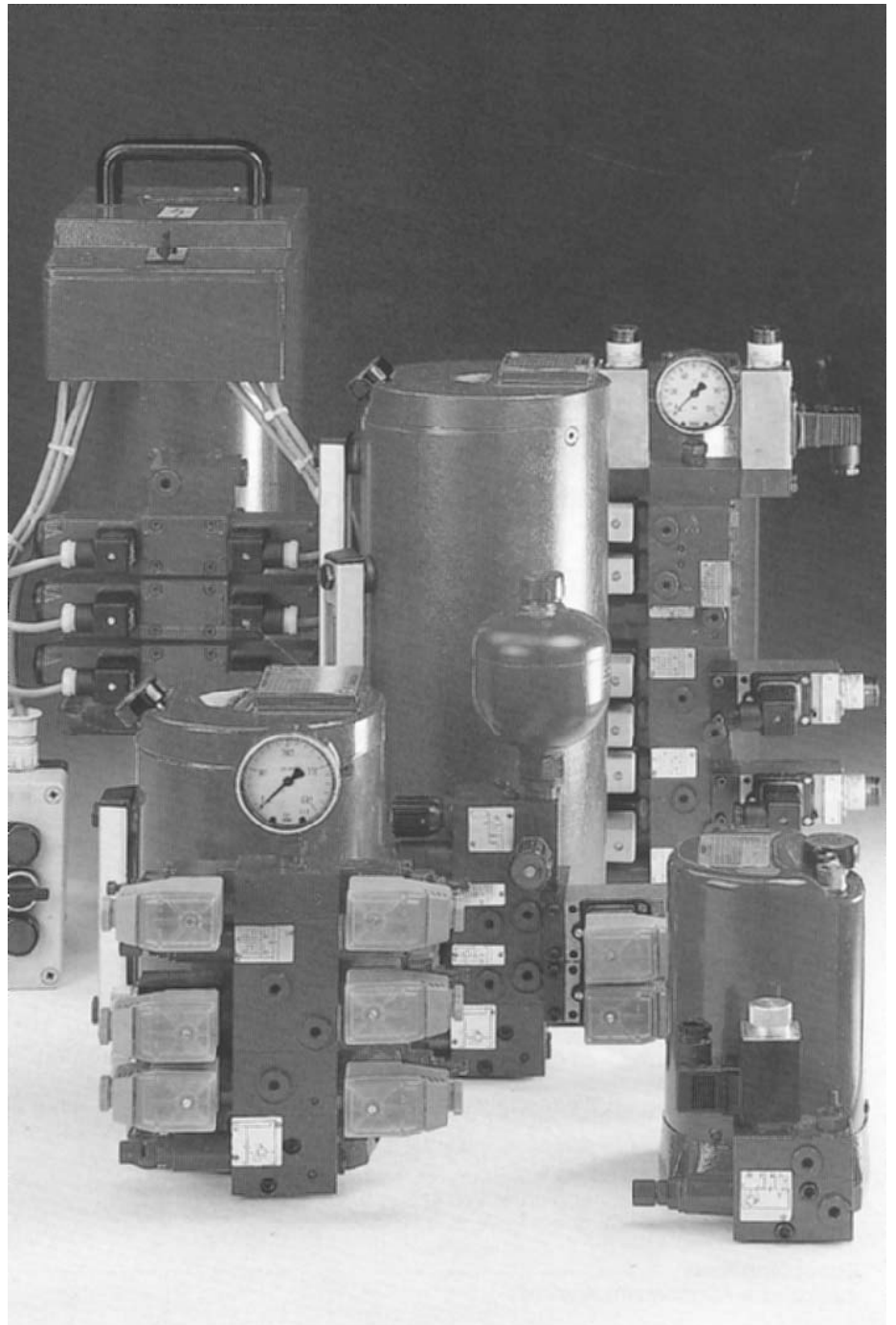
INTERNATIONAL

High Pressure Power Unit HP



up to 500 bar
up to 5.25 l/min

suitable for:
short-term operation S 2
intermittent operation S 3



1. DESCRIPTION

1.1. GENERAL

HYDAC high pressure power units, type HP, are high performance hydraulic units of compact construction. They are used to supply oil to hydraulic systems. The flow of the operating fluid is controlled by an extensive range of build-on controls. The special design and the use of a noise-damping cast-iron housing result in a particularly low noise level.

1.2. FUNCTION

Three valve-controlled radial piston pump elements are operated, independent of the direction of rotation, by a cam, which is driven by an oil-immersed motor.

The HP power unit owes its special stability to the steel oil tank.

The four fixing holes in the foot bracket make for cost-saving, simple installation. The terminal box in the cover plate (HP 1 and HP 2) simplifies the electrical installation.

HP type units must only be used for short-term or intermittent operation because of their compact design, and the high specific performance due to the thermal load.

The switch-on time, dependent on the output and the operating and ambient conditions, must be selected to ensure that the max. permissible operating temperature (oil temperature in the unit) of 80 °C is not exceeded.

A temperature switch can be supplied for independent monitoring of the operating temperature.

1.3. APPLICATIONS

HP type units are particularly suitable for:

- tensioning, clamping, releasing, indexing on machine tools, presses and jigs
- operating lifting and swivel devices
- dock levellers and vehicle lifts
- auxiliary and off-line drives
- hydraulic tools as a drive unit
- pressure controls
- industrial and mobile braking systems
- cutting and shearing operations
- weight compensation
- valve drives

Not suitable for long-term operation!

Note!

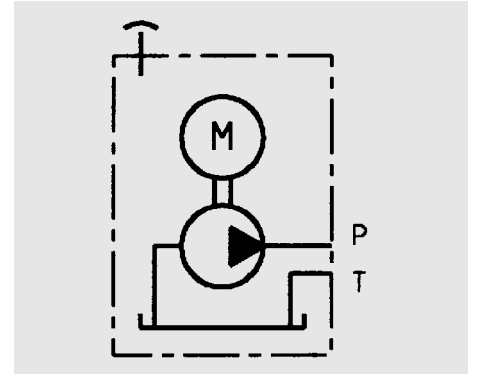
- do not use unit in applications for which it is not intended
- unit produces high pressure
- do not exceed max. permissible pressure
- tank can become hot during operation – risk of injury

2. TECHNICAL SPECIFICATIONS

2.1. GENERAL

2.1.1. Designation and symbol

Electro-hydraulic power unit



2.1.2. Type of construction

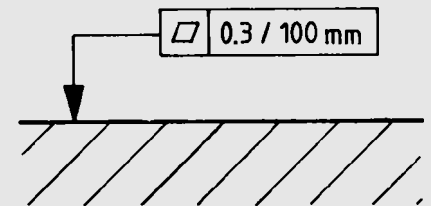
Valve-controlled hydraulic pump, radial piston type, with a constant displacement volume, driven by an oil-immersed electric motor.

2.1.3. Type of mounting

Mounting holes on the foot bracket for 4 screws

M 6 ... HP 0
M 8 ... HP 1, HP 2

Required surface finish of the mounting area:



or use flexible mounting elements.
Also see point 2.1.15.

2.1.4. Weights (dry units)

HP 0	7.2 kg
HP 1	16.5 kg
HP 1 H	18.3 kg
HP 2	21.5 kg
HP 2 H	...	25.7 kg

2.1.5. Ambient temperature

- 20 °C to + 40 °C

2.1.6. Direction of rotation (motor)

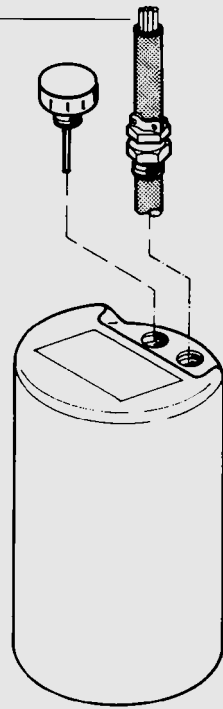
Optional

2.1.7. Mounting position

Vertical, air breather and terminal box on the top.

CONSTRUCTION OF THE HP POWER UNIT

HP 0
with approx. 3 m
flying leads, incl.
tension-free PG
gland

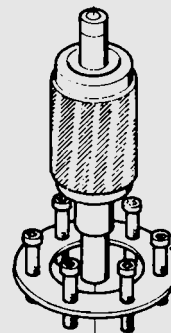
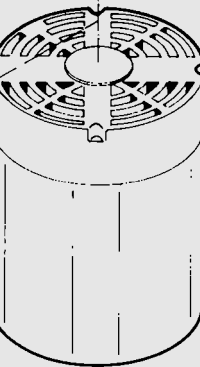


Air breather
with dipstick
optionally BF 4 –10 µm

HP 1, HP 2
built-in terminal box
with terminal strip
for motor and
temperature switch

Tank
inherently stable
various tank sizes
steel

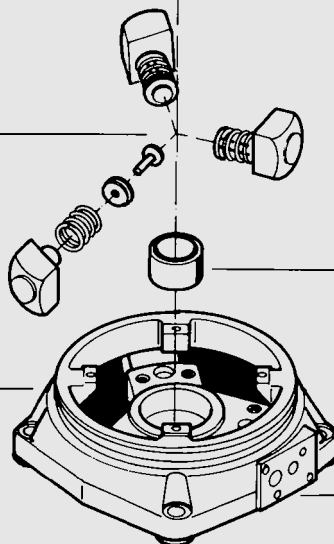
**Oil-immersed
motor**
squirrel-cage motor
low-noise
oil-cooled



Triple cylinder radial piston pump
valve-controlled
independent of direction of rotation
for high pressure
narrow flow rate gradation

Pump bearing
friction bearing
low-noise

Unit flange
spherical cast iron
inherently stable
noise-damping
through bores for simple mounting



Connection flange
for build-on controls

2.1.8. **Model code**
(also order example)

Power unit	Addit. units	Build-on control	Suppl. details
HP 1 H F Z5L - 0.82 - 05 - X 1 TS T + + +G24 - Z4 -N +			
<p>High pressure power unit _____</p> <p>Size _____ For selection criteria see point 2.1.9. and 2.1.11. 0 1 2</p> <p>Tank size _____ no details ... standard tank H ... tall tank for usable volume see point 2.1.11.</p> <p>Fluid level gauge _____ no details ... no fluid level gauge F ... FSA 0 ... FSK, N/C contact 00 ... FSK, 2 off, at different heights (HP 1, HP 2) (see point 2.1.11. and 2.1.12.)</p> <p>Electrical connection for FSK _____ no details ... small connector (standard) Z5L ... large connector with light</p> <p>Flow rate code _____ see point 2.1.9.</p> <p>Motor code _____ see point 2.1.10.</p> <p>Modification number _____</p> <p>Air breather _____ no details ... standard air breather 1 ... BF4, filtration rating 10 µm (see point 2.1.13.)</p> <p>Temperature switch _____ no details ... no temperature switch TS ... temperature switch, actuating temperature 80 °C ± 2.5 K (see point 2.1.14.)</p> <p>Carrying handle _____ no details ... no carrying handle T ... carrying handle (see point 4.)</p> <p>Additional units _____ (see point 3.1.) no details ... no additional units</p> <p>Build-on control _____ (see point 5.)</p> <p>Nominal voltage for actuating solenoid _____ (only for build-on control) G 24 ... 24 V DC W 230 ... 230 V 50/60 Hz AC other voltages on request</p> <p>Electrical connection for actuating solenoid _____ no details ... socket to DIN 43650 without connector Z4 ... connector to DIN 43650-AF2-PG11 Z5L ... large connector with light For AC voltage the connector is supplied with a bridge rectifier insert.</p> <p>Emergency manual override on directional seat valves _____ (see point 6.2.) no details ... no emergency manual override N ... pin type operation NG ... thumb pressure operation for symbols V, W, Y, YR, only</p> <p>Supplementary details _____ Please quote supplementary details in full</p>			

2.1.9. Flow rate code table

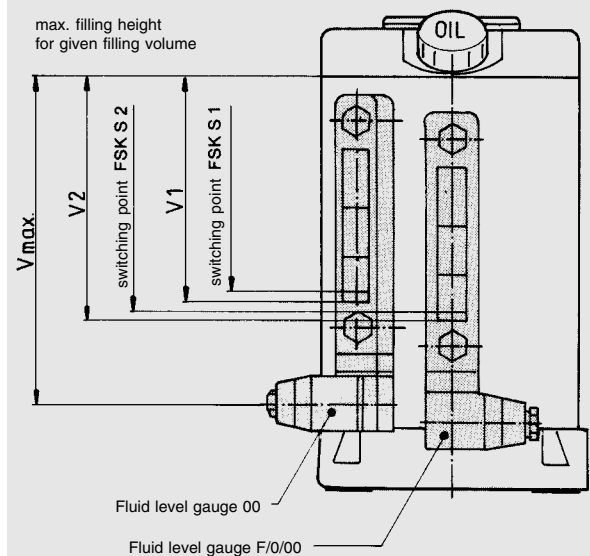
	Flow rate code		Three phase (3~) motor			Single phase motor (1~)		
	50 Hz	60 Hz	Nom. press. (bar)	Motor output P (kW)		Nom. press. (bar)	Motor output P (kW)	
				50 Hz	60 Hz		50 Hz	60 Hz
HP 0	0.30	0.36	500	0.28	0.33	500	0.24	0.28
	0.52	0.62	390	0.28	0.33	330	0.24	0.28
	0.82	0.95	240	0.28	0.33	210	0.24	0.28
	1.05	–	230	0.33	–	200	0.28	–
	1.25	1.50	160	0.28	0.33	135	0.24	0.28
	1.65	–	150	0.33	–	125	0.28	–
	1.70	1.95	120	0.28	0.33	100	0.24	0.28
	2.50	–	100	0.33	–	80	0.28	–
3.35	–	75	0.33	–	60	0.28	–	
HP 1	0.49	0.60	500	0.7	0.8	500	0.6	0.7
	0.82	1.00	500	0.7	0.8	450	0.6	0.7
	1.00	1.20	500	1.05	1.2	500	0.9	1.05
	1.25	1.50	380	0.7	0.8	300	0.6	0.7
	1.70	–	420	1.05	–	350	0.9	–
	1.95	2.40	250	0.7	0.8	190	0.6	0.7
	2.55	–	270	1.05	–	220	0.9	–
	2.60	3.15	180	0.7	0.8	130	0.6	0.7
	4.00	–	170	1.05	–	140	0.9	–
5.25	–	120	1.05	–	100	0.9	–	
HP 2	0.49	0.60	500	0.95	1.1	500	0.95	1.1
	0.82	1.00	500	0.95	1.1	500	0.95	1.1
	1.00	1.20	500	1.60	1.85	500	1.40	1.6
	1.25	1.50	450	0.95	1.1	450	0.95	1.1
	1.70	–	500	1.60	–	500	1.40	–
	1.95	2.40	350	0.95	1.1	300	0.95	1.1
	2.55	–	450	1.60	–	340	1.40	–
	2.60	3.15	250	0.95	1.1	230	0.95	1.1
	4.00	–	300	1.60	–	220	1.40	–
5.25	–	200	1.60	–	150	1.40	–	

Note! The nominal pressure of the build-on control must be taken into account.
 The flow rate code is approximately equivalent to the flow rate (l/min) at nominal rpm.
 At nominal pressure the flow rate is 0.8 to 0.92 x flow rate code.
 Model recommended due to its particularly low noise level.

2.1.10. Motor code table

	HP 0	HP1/HP2
05...3-phase	400 V – 50 Hz	230/400 V – 50 Hz
06...3-phase	415 V – 50 Hz	240/415 V – 50 Hz
08...3-phase	500 V – 50 Hz	290/500 V – 50 Hz
09...3-phase	660 V – 50 Hz	380/660 V – 50 Hz
34...3-phase	400 V – 60 Hz	230/400 V – 60 Hz
36...3-phase	460 V – 60 Hz	266/460 V – 60 Hz
	HP 0 / HP 1 / HP 2	
61...single phase	230 V – 50 Hz	
62...single phase	240 V – 50 Hz	
80...single phase	115 V – 60 Hz	

2.1.11. Oil volume (l)



Approximate values, component-related deviations are possible.

	Filling volume (l)	Usable volume (l)		
		V_{max}	V_1	V_2
HP 0	1.1	0.7	–	–
HP 1	2.4	1.6	1.15	1.3
HP 1 H	4.0	3.2	2.75	2.9
HP 2	4.0	2.8	2.0	2.2
HP 2 H	7.0	5.8	4.6	4.7

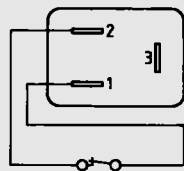
S1: early warning point
 (on model 00 = 2 x FSK)
 S2: min. switching point

2.1.12. Fluid level gauge

FSA ...
visual fluid level gauge
FSK ...
visual fluid level gauge
with additional electrical contact
before the minimum fluid level is
reached

Electrical function FSK

0 = N/C contact



Contact load: max. 8 W
Switching voltage:
max. 50 V AC/DC
Switching current: max. 0.2 A
Terminal 3 not connected
Electrical connection:
small connector (standard)
Z5L ... large connector with light
(24–50 V AC/DC)

2.1.13. Air breather BF4

Filtration rating 10 µm,
without dipstick,
for use in highly contaminated
environments.

2.1.14. Temperature switch TS

To protect the unit from
overheating.
Actuating temperature:
80 °C ± 2.5 K
Switch-back hysteresis:
approx. 10 K – 30 K
Nominal voltage:
AC max. 250 V
DC max. 60 V
Current capacity with AC:
1.6 A at cos φ = 0.6
2.5 A at cos φ = 1.0
DC:
60 V = 1.0 A
42 V = 1.2 A
6/12/24 V = 1.5 A
Type of contact: N/C
Connection: terminal in terminal
box (HP1 and HP2), flying leads,
approx. 400 mm long (HP0)

2.1.15. Noise generation

Due to their design, HP power
units are extremely quiet. The
noise generation is determined
mainly by the installation site and
the type of mounting. We
recommend that the unit is
mounted on vibration mounts and
that pressure hoses are used.

Noise levels:

44–70 dBA for those units in table
2.1.9. which are designated as
being especially low-noise.
Max. 80 dBA for all other units.

2.2. HYDRAULIC DETAILS

2.2.1. Nominal pressure

$p_N = 500$ bar max.
see point 2.1.9.
When using build-on controls,
the nominal pressure of these
units must be taken into account.

2.2.2. Flow rate

$Q = 0.30$ to 5.25 l/min
see point 2.1.9.

2.2.3. Operating fluid

Hydraulic oil to DIN 51524 part 2

2.2.4. Fluid temperature range

Min. – 20 °C
Max. + 80 °C

2.2.5. Viscosity range

Min. 10 mm²/s
Max. 380 mm²/s
Optimum viscosity range 12 to
200 mm²/s.
Max. initial viscosity 800 mm²/s

2.2.6. Filtration

Max. permissible contamination
level of the operating fluid

- **At operating pressure up to 350 bar**

to NAS 1638, class 10.
We recommend a filter with a
minimum retention rate of
 $\beta_{20} \geq 100$.

- **At operating pressure up to 500 bar**

to NAS 1638, class 9.
We recommend a filter with a
minimum retention rate of
 $\beta_{10} \geq 100$.

The fitting of filters and regular
replacement of elements
guarantees correct functioning,
reduces wear and tear and
increases the service life.
Only filtered oil must be used!
Filtration and filling can be carried
out simply and quickly in one
operation using a filtration unit,
the OF type for example. If the
unit is used in a highly
contaminated environment, the
use of an air breather, type BF 4,
is recommended.

2.3. ELECTRICAL DETAILS

2.3.1. Type of construction

Three-phase squirrel-cage motor
or single phase motor (supplied
with continuous operation
condenser), oil-cooled.

2.3.2. Nominal voltage

3 – 230 / 400 V – 50 Hz
Standard model
other voltages available on
request (see point 2.1.10.)

2.3.3. Type of operation

Short-term operation S 2
Intermittent operation S 3
to VDE 0530
The switch-on time, dependent
on the output, the operating and
ambient conditions, must be
selected to ensure that the
maximum permissible operating
temperature (that of the oil in the
unit) of 80 °C is not exceeded.
If necessary, fit a temperature
switch (see point 2.1.14.)

2.3.4. Safety type

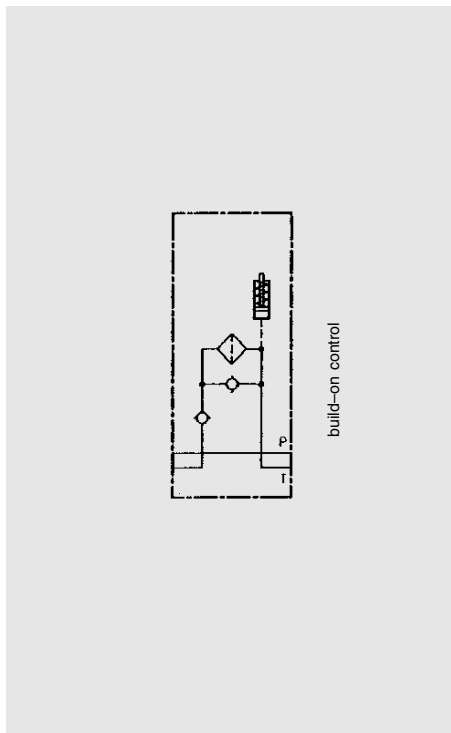
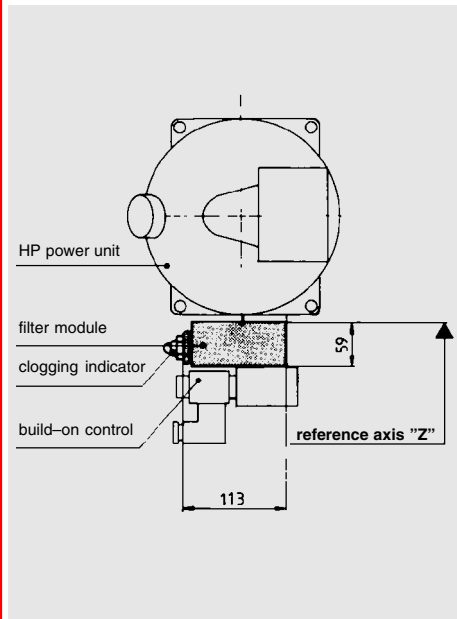
DIN 40050 – IP 54 for a
completely assembled unit with
correct electrical connection.

2.3.5. Type of connection

HP 1 / HP 2 ...
Terminal box with terminal strip
HP 0 ...
approx. 3 m long flying leads

3. ADDITIONAL UNITS

3.1. RETURN LINE FILTER MODULE



Return line filter module between HP power unit and build-on control including check valve (prevents the tank from emptying when the filter element is changed).

Model code

	F T R 20 B . X
Filter module	_____
Filter in the T line	_____
Bypass valve RV	_____
no details . . . no bypass	
R . . with bypass valve	
$p_0 = 4.5 \text{ bar}$	
Filtration rating	_____
20 . . . 20 μm (standard)	
10 . . . 10 μm	
5 . . . 5 μm	
Clogging indicator	_____
B	visual indicator
C	electrical indicator
D 24	comb. vis./elec. indicator
D 24	(15 – 30 V DC/AC)
D 48	(30 – 60 V DC/AC)
D 110	(100 – 130 V DC/AC)
D 230	(150 – 230 V DC/AC)
For further details, see the Clogging Indicators for Filters brochure, no. E 7.050	
Modification number	_____

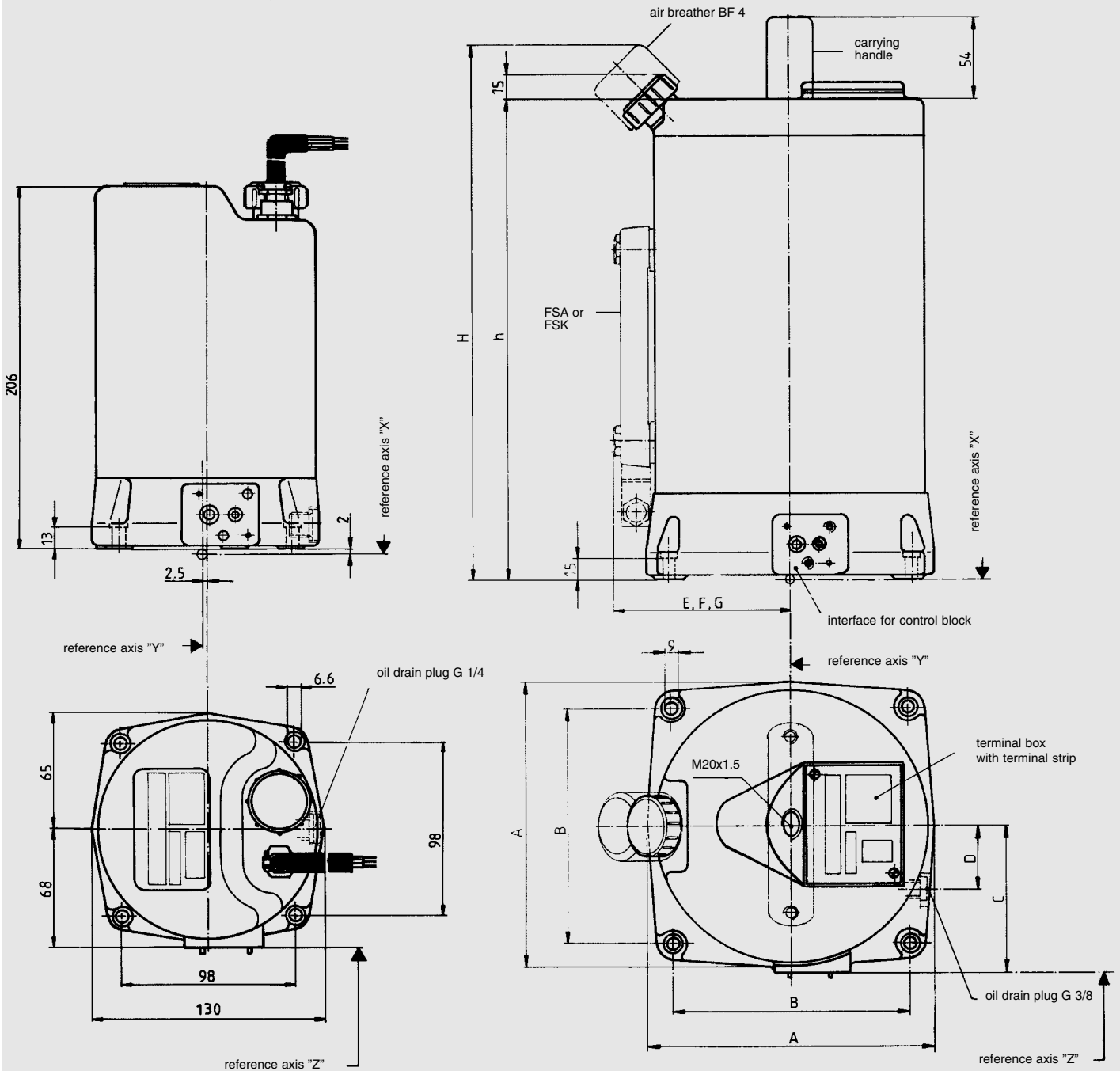
4. DIMENSIONS

Power unit

The axes X, Y and Z are reference axes for calculating the installation dimensions when adding modules as per point 5. (Build-on controls).

HP 0

HP 1/HP 2



Type	A	B	C	D	E	F	G	H	h
HP 1	164	125	85	40	107	115	143	315	281
HP 2	190	156	98	50	117	125	153	350	316
HP 1 H	164	125	85	40	107	115	143	424	390
HP 2 H	190	156	98	50	117	125	153	484	450

E...clearance for FSA

F... clearance for FSK, small connector

G...clearance for FSK, Z5L – large connector with lamp

All measurements in mm. For dimensions of build-on controls, see point 5.

5. BUILD-ON CONTROLS

5.1. OVERVIEW

Build-on controls and high pressure power units, type HP, combine to make a unit ready for installation. The build-on controls can be arranged to suit individual applications. Three types of build-on control systems are available.

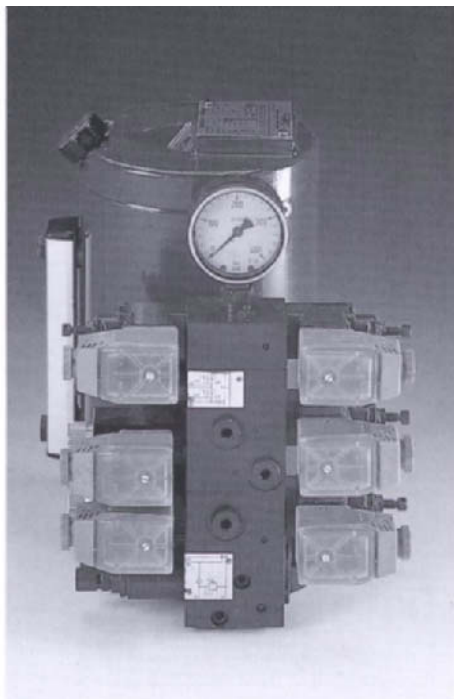
Build-on modules

(see point 5.2.)

Modular valve stacking system

(see brochure no. E5.304.)

Valve stacking modules for valves with A6 interface to DIN 24340 (see point 5.3.)



Build-on control module

Build-on modules are flanged directly onto the connection flange of the HP unit. They consist of various different types of valves as well as all connections necessary for operation.

Valve stacking system L

Modules with directional seat valves, pressure and check valves as well as pressure switches can be combined on a base module in any order, depending on the control task. It is always finished off with an end module. For model codes and dimensions, see brochure no. E5.304. "Valve stacking system L".

Valve stacking modules CL

Up to six horizontal stacking modules can be mounted onto a base module. A vertical stacking system consisting of directional valves or sandwich plate valves with A6 interface to DIN 24340 is fitted onto the valve stacking modules. It is always finished off with an end module.

Note:

Build-on module controls and modules of control types L and CL cannot be combined.

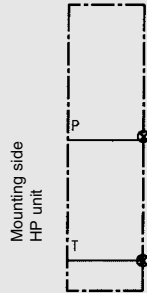
Special controls:

For control tasks which cannot be solved with standard controls, special control blocks can be fitted to the unit according to customers' specifications.

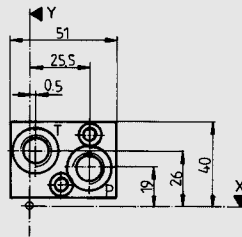
5.2. BUILD-ON MODULES
Ports P, T, M, A...G 1/4

Designation and symbol

Connecting module
Inline mounting



Dimensions



Installation dimension Z: 25 max.

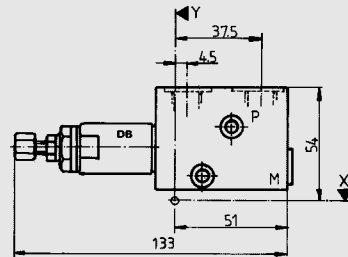
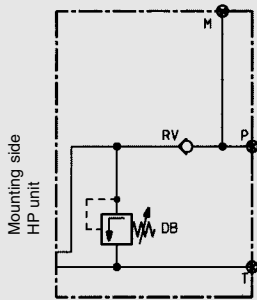
Model code

G 1/4

Type _____

$P_N = 500$ bar

Base module



Installation dimension Z: 30 max.

GRD 350 M

Type _____

GD no check valve RV

GRD with check valve RV

Pressure relief valve DB

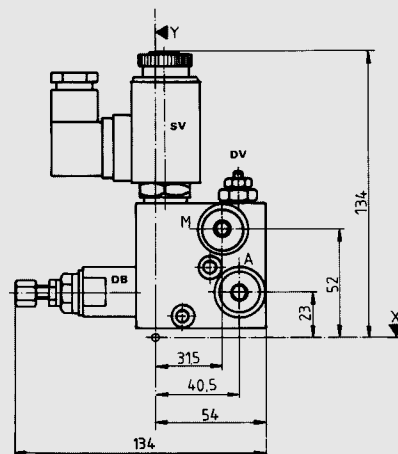
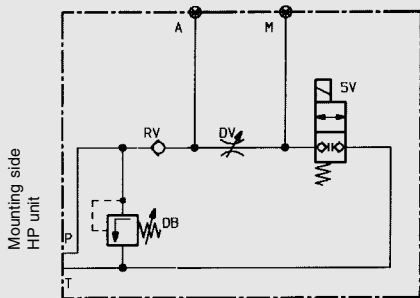
Pressure range

and type of adjustment

see point 6.4.

$P_N = 500$ bar

Lift/lower module



Installation dimension Z: 43 max.

SW 3 Z 200 M + G...
W...

Type _____

Directional seat valve SV

possible symbols

V, W, Y, Z

see point 6.5.

Pressure relief valve DB

Pressure range

and type of adjustment

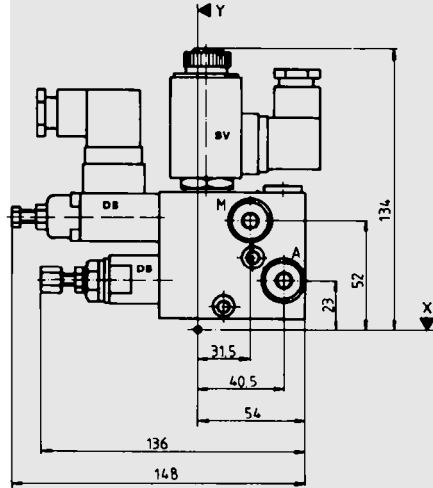
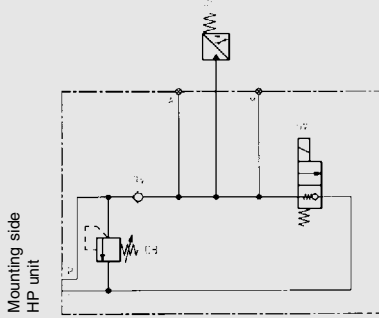
see point 6.4.

see point 2.1.8.

(build-on control)

$P_N = 350$ bar

Pressure control module



Installation dimension Z: 43 max.

SB 3 Z -5 / 350 M + W... G...

Type

Directional seat valve SV
possible symbols
V, W, Y, Z
see point 6.5.

Pressure switch DS
see point 6.3.

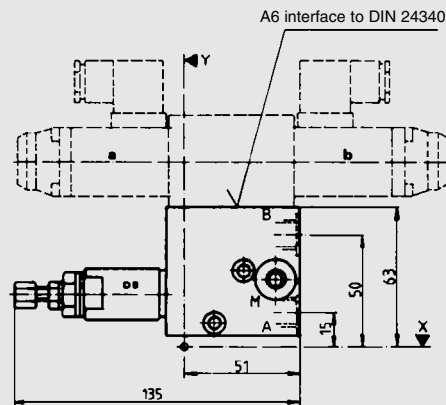
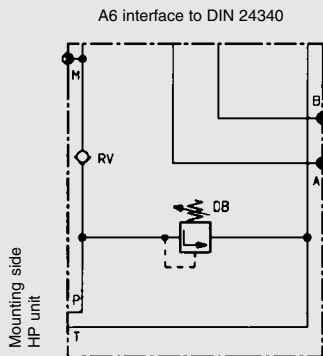
Pressure relief valve DB
Pressure range and type of adjustment
see point 6.4.

see point 2.1.8.
(build-on control)

p_N = 350 bar

Build-on module for valves with A6 interface to DIN 24340

Directional valve and sandwich plate valve construction possible



Installation dimension Z: 53 max.

CE R D 350 M - ...

Type

Check valve RV
no details ... no RV
R ... with RV

Pressure relief valve DB
D ... with DB

DB pressure range and type of adjustment
see point 6.4.

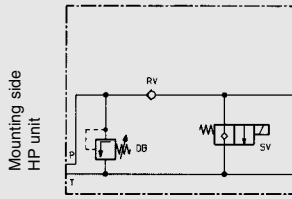
p_N = 350 bar
(or max. pressure of the built-on valves)

5.3. VALVE STACKING MODULES

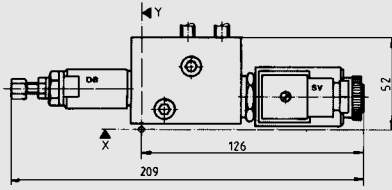
For valves with A6 interface to DIN 24340 (p_N = 350 bar), ports A, B, P, T ... G 3/8

Designation and symbol

Base module



Dimensions



Installation dimension Z: 88 max.

Model code

CL ... R D 350 M Z - ... +

Type _____

No. of valve stacking modules (max. 6) _____

Check valve RV
no details ... no RV
R ... with RV

Pressure relief valve DB
D ... with DB

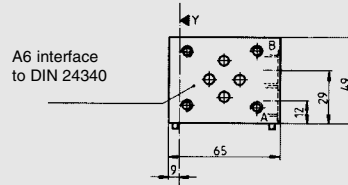
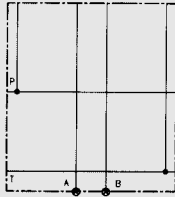
DB pressure range and type of adjustment
see point 6.4.

Directional seat valve SV
no details ... no SV
possible symbols V, W, Y, Z
see point 6.5.

Directional valves and sandwich plate valves
with standardised interface
(see point 6.1.3.)

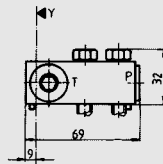
Valve stacking module

A6 interface to DIN 24340



Installation dimension Z: 50 max.

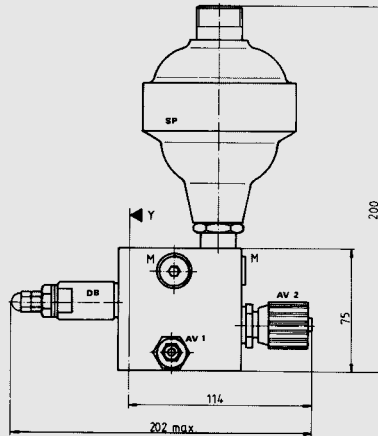
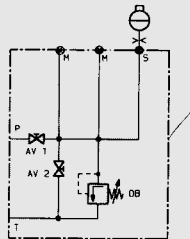
Standard end module



Installation dimension Z: 52 max.

Typ _____ + PL

Accumulator safety end module



Port M ... G 1/4

+ PT 350 P 350 TÜV - ...

Type _____

DB
pressure range
(see point 6.4.)

DB
type of adjustment
P ... can be lead-sealed,
on TÜV version
lead-sealed

Pre-set cracking pressure DB
TÜV ... with TÜV approval for DB
no details ... no TÜV approval for DB

Details for pressure accumulator SP
Please quote in full
(see point 6.1.2.)

6. DESIGN RECOMMENDATIONS

6.1. DOCUMENTATION

6.1.1. Valves and units

- DB – Pressure relief valves
DB 4E
Brochure No. E 5.161
- Pressure relief valves
DB 4E
pressure-set and
lead-sealed
Brochure No. E 5.163
- DMV – Pressure reducing
valves
Brochure No. E 5.162
- DV – Flow control valves
DV 5E
Brochure No. E 5.113
- RV – Check valves RVE
Brochure No. E 5.176
- SV – 2/2 directional seat
valves 2 SVE
Brochure No. E 5.204
- DS – Pressure switches
Series 5 – 8

6.2. EMERGENCY MANUAL OVERRIDE FOR DIRECTIONAL SEAT VALVES SV

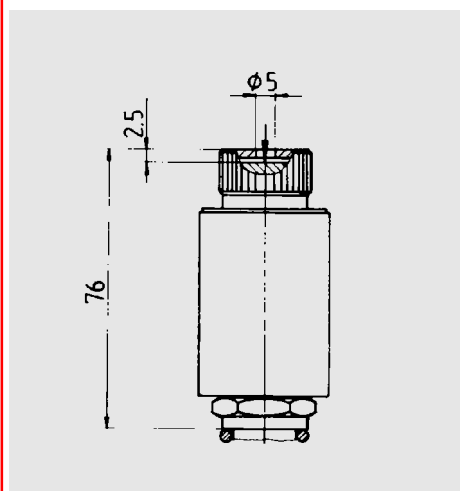
N ... pin type operation

Available for symbols V, W, Y, YR,

Mechanical operation is only possible with a pin.

The opening has a diameter of 5 mm. The pin is countersunk by 2.5 mm. The operating stroke is 1.5 mm.

The valve is switched as pressure is applied to the actuating mechanism by means of an appropriate pin.



6.1.2. Hydraulic accumulators

The following hydraulic accumulators can be fitted (when ordering, please state type in full):
Diaphragm accumulators, weld or screw version, type: SBO
Brochure No. E 3.100
Bladder accumulators type: SB
Brochure No. E 3.201

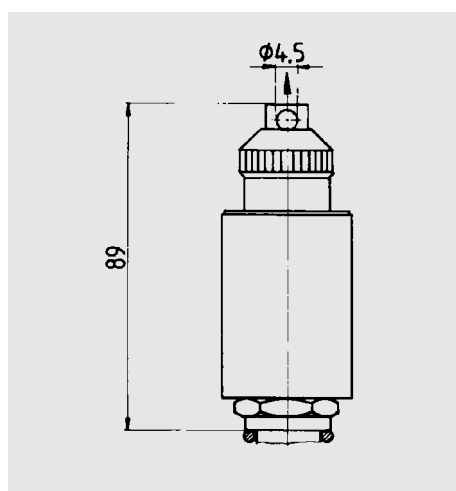
6.1.3. Valves with A6 interface to DIN 24340

All directional valves with A6 interface to DIN 24340 or CETOP R35H-42-4-03 can be fitted to the CE build-on module and the CL horizontal stacking modules. For example: HYDAC directional seat valves WSE 3 D as per brochure No. E 5.203 or directional spool valves. Directional valves and sandwich plate valves can be supplied, if required. Please give symbols in full or specify circuit diagram.

N ... pin type operation

Available for symbols Z, ZR

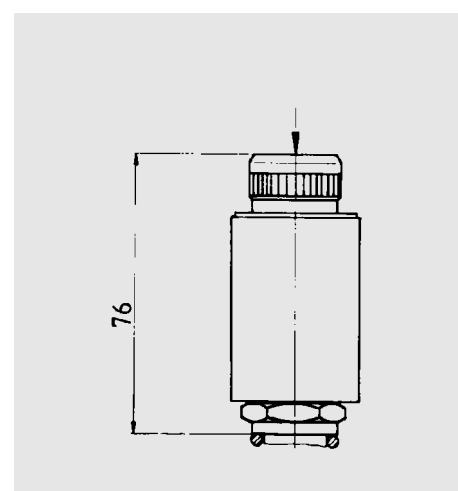
The valve is switched as the actuating mechanism is pulled out using an appropriate tool. The operating stroke is 1.5 mm.



NG ... thumb pressure operation (rubber cap)

Available for symbols V, W, Y, YR,

Manual operation is possible without tool (thumb pressure).

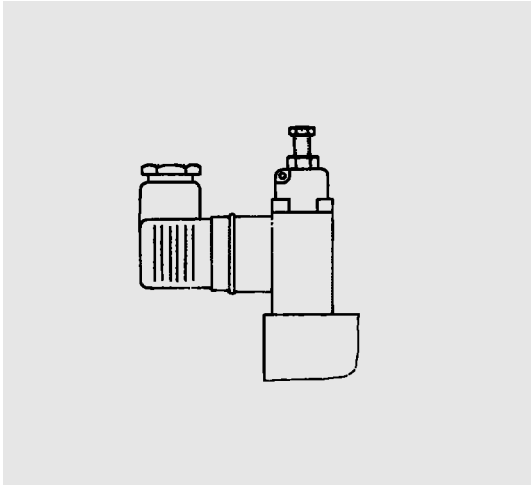


6.3. PRESSURE SWITCH DS

Series 5 – 8

Order code	Pressure range
5	50 bar
6	200 bar
7	350 bar
8	630 bar

- with adjustment screw
- compact construction



If solenoid valves with Z4 connectors are ordered, pressure switches with Z14 connectors are supplied (standard).
If solenoid valves with Z5L connectors are ordered, pressure switches with Z15L connectors are supplied.

7. NOTE

The information in this brochure relates to the operating conditions and applications described.
For applications or operating conditions not described, please contact the relevant technical department.
Subject to technical modifications.

6.4. ORDER DETAILS FOR PRESSURE RELIEF VALVE DB

350 M 315 – 300

Pressure range

- 100 (... 100 bar)
- 200 (... 200 bar)
- 350 (... 350 bar)
- 630 (... 630 bar)

Type of adjustment

- F ... fixed setting
- M ... adjustable, advise pressure setting limit (standard)
- SM ... scaled knob, advise pressure setting limit
- P ... can be lead-sealed
- A ... lockable, 2H lock

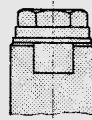
Max. pressure setting

Must be specified for M and SM
not required for A, F and P

Pre-set cracking pressure

Must be specified for F
Optional for M, SM, A, P
(no details: spring not set)

F



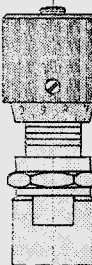
P



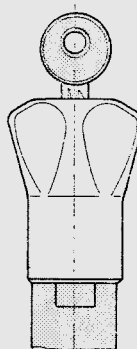
M (standard)



SM



A

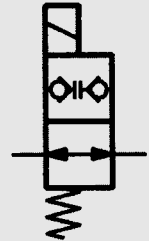


6.5. 2/2 DIRECTIONAL SEAT VALVES SV

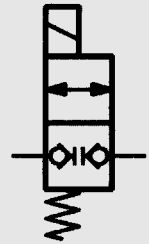
Symbols

(For nominal voltage, electrical connection and emergency manual override of actuating solenoids, see point 2.1.8. Build-on control)

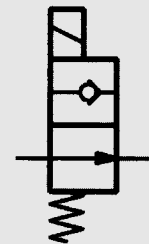
V



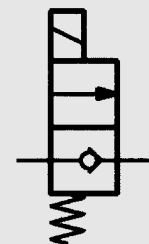
W



Y



Z



NOTES