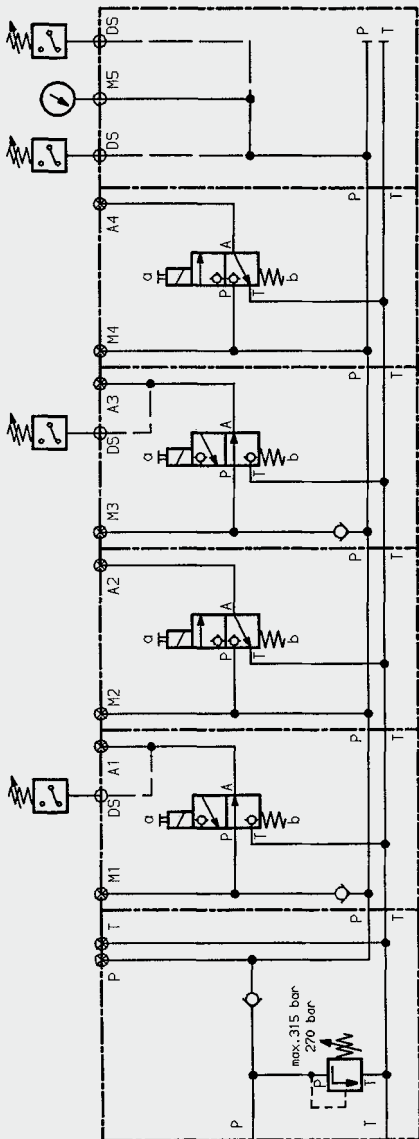
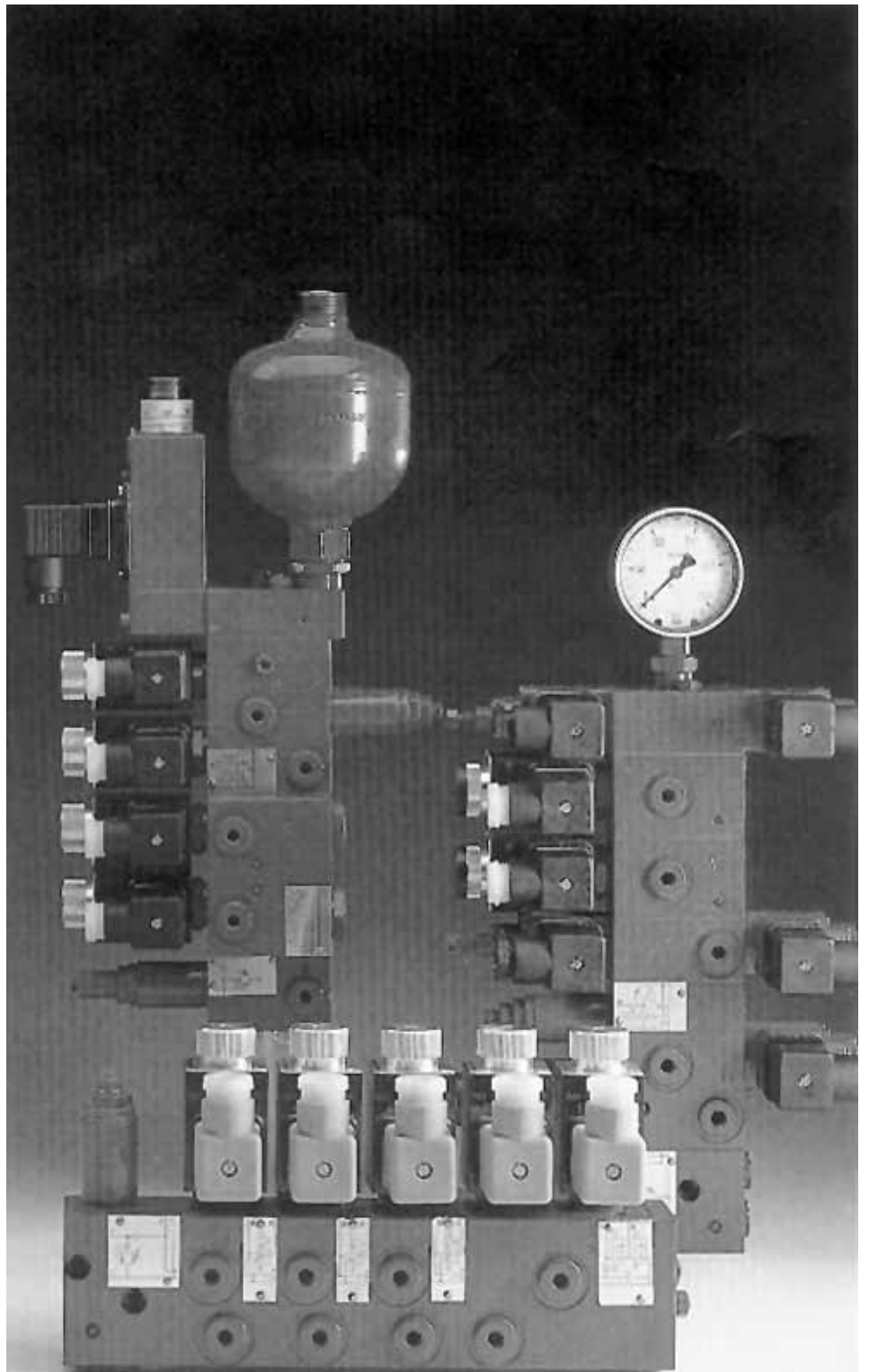


## Valve Stacking System L



Up to 500 bar  
Up to 12 l/min



## 1. DESCRIPTION

### 1.1. GENERAL

The HYDAC valve stacking system, type L, is a control block composed of individual modules for hydraulic systems in parallel arrangement. This system is designed chiefly for controlling low-volume consumers and for pressure/force resistance tasks.

Function modules with directional poppet valves, pressure and shut-off valves and pressure switches can be combined on a base module in any order in accordance with the sequence of the control tasks. The end is represented by an end module with or without additional functions. The stack is held together with two tie-bolts.

Different base modules are suitable for building onto HYDAC HP and CA power units, or onto any hydraulic system by means of an inline base module.

This modular system ensures:

- A high level of flexibility due to variable module arrangement,
- Individual solutions to control problems
- Small dimensions combined with high performance
- No leakage
- Cost-effective control due to series production of modules.

### 1.2. FUNCTION

With a central pressure and return line, oil can be supplied to or released from several consumers simultaneously or independently. It is possible to separate the functions of consumers which are arranged in parallel by using check valves and special modules. Built-on pressure switches enable simple control of the pump and pressure monitoring, also on the consumer.

Leakage-free directional poppet valves provide secure positioning of the consumer and maintain pressures over a longer time without repeated oil supply.

Through the use of appropriate modules, the pressure in the central pressure line can also be shut-off or altered.

### 1.3. APPLICATIONS

In conjunction with power units, valve stacking systems type L can be used as ready-to-install oil supply units.

The systems are particularly compact when combined with HYDAC HP and CA power units.

Valve stacking systems are used in the following areas:

- Hydraulic clamping systems
- Machine tool engineering
- Press manufacture
- Fixture construction
- Loading and feeding apparatus
- Auxiliary and parallel drives
- Mobile hydraulics etc.

## 2. SPECIFICATIONS

### 2.1. GENERAL

#### 2.1.1 Basic model

Valve stacking system in parallel arrangement.

#### 2.1.2 Type of construction

Control modules in sandwich stacking construction with valve cartridges and additional devices.

#### 2.1.3 Type of mounting

2 screws M6 for HP and CA mounting.

2 threaded holes M8 in the base block on RL and RLRD and in the end module PF.

It is also possible to insert a mounting sandwich plate in the control (necessary for support when the stack is approx. 500 mm or above in length).

#### 2.1.4 Weight

The total weight of a stack is derived from the sum of the weights of the individual modules (see point 3.2. - 3.4.) and of the valves and units fitted (see point 4).

#### 2.1.5 Ambient temperature range

Min. – 20 °C

Max. + 40 °C

#### 2.1.6 Installation

When building onto HP and CA, determined by the unit. As a control strip, optional.

#### 2.1.7 Flow direction

According to symbol, only permitted in direction of arrow.

### 2.2. HYDRAULIC DETAILS

#### 2.2.1 Nominal pressure

For building onto inline base block  
 $p_N = 350$  bar

For building onto CA unit

$p_N = 210$  bar

For building onto HP unit

$p_N = 500$  bar

Exceptions:

modules with 2/2 directional poppet valves, symbol Z, Y, V, W  
 $p_N = 350$  bar

#### 2.2.2 Flow rate

$Q_{max} = 12$  l/min

Pressure-related performance limits of the individual valves and units must be taken into account. See point 4 for design recommendations.

#### 2.2.3 Operating Fluid

Hydraulic oil to DIN 51 524 Part 1 and 2

### 2.2.4 Temperature range of operating fluid

Min.  $-20\text{ }^{\circ}\text{C}$   
Max.  $+80\text{ }^{\circ}\text{C}$

### 2.2.5 Viscosity range

Min.  $10\text{ mm}^2/\text{s}$   
Max.  $380\text{ mm}^2/\text{s}$

### 2.2.6 Filtration

Max. permitted contamination level of the operating fluid:

#### – For operating pressure up to 350 bar

NAS 1638, class 10.

We recommend a filter with a minimum retention rate of  $\beta_{20} \geq 100$

#### – For operating pressure up to 500 bar

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.

## 2.3. ELECTRICAL DETAILS

### 2.3.1 Type of actuation

Solenoid-operated by means of pressure-tight, wet-pin single stroke solenoids to VDE 0580.

### 2.3.2 Type of voltage

#### Switching solenoids:

DC solenoid  
(code G)

For use with AC, the required DC is produced by using a bridge rectifier connector (code W)

#### Proportional solenoid:

DC solenoid G 24.

### 2.3.3 Nominal voltage $U_N$

Standard voltages

Voltage type G: 24 V

Voltage type W: 220 V

Other voltages in the range 6 to 240 V are also available on request.

### 2.3.4 Voltage tolerance

+ 10 %

– 5 %

### 2.3.5 Power consumption

$p_{20} = 26\text{ W}$

### 2.3.6 Duty cycle

100% = continuous operation

### 2.3.7 Protection class

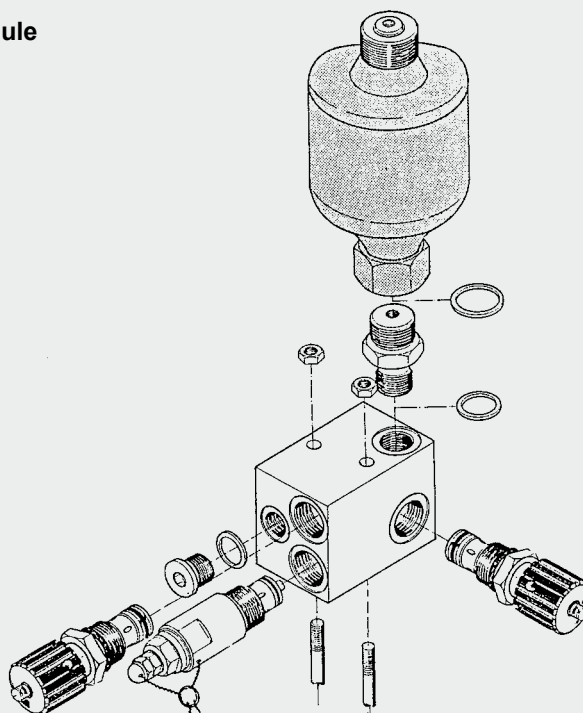
IP 65 to DIN 40050 provided connector is fitted correctly.

### 2.3.8 Switching frequency

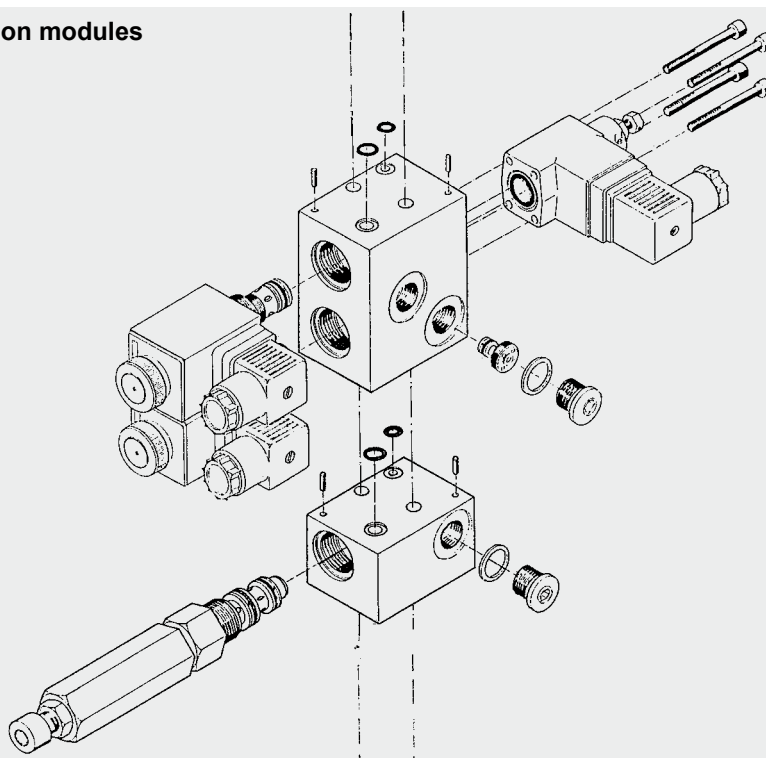
3,600 per hour

## EXPLODED DIAGRAM OF SYSTEM CONSTRUCTION

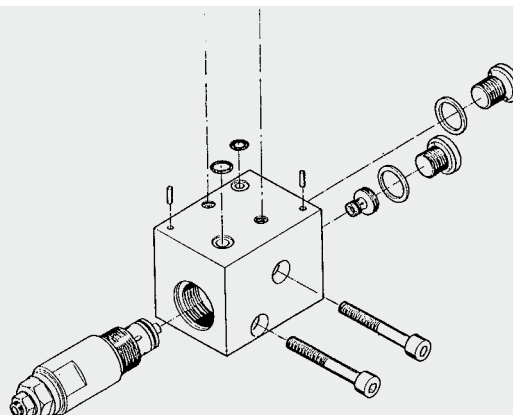
### End module



### Function modules



### Base module



### 3. SELECTION TABLE, SYMBOL, DIMENSIONS, WEIGHT, TYPE

#### 3.1. MODEL CODE

(also order example)

LR/350M315-270 + DR-7 + C + DR-7 + C + PB-77/63-400 + G24 - Z4 - N

Valve stacking base module  
(see point 3.2.)

Function modules  
(see point 3.3.)

1st function module

2nd function module

3rd function module

4th function module

... further function modules

End modules (see point 3.4.)

Nominal voltage for actuating solenoids

G 24 ... DC 24 V  
W 220 ... AC 220 V-50/60 Hz  
other voltages on request

Electrical connection for actuating solenoids

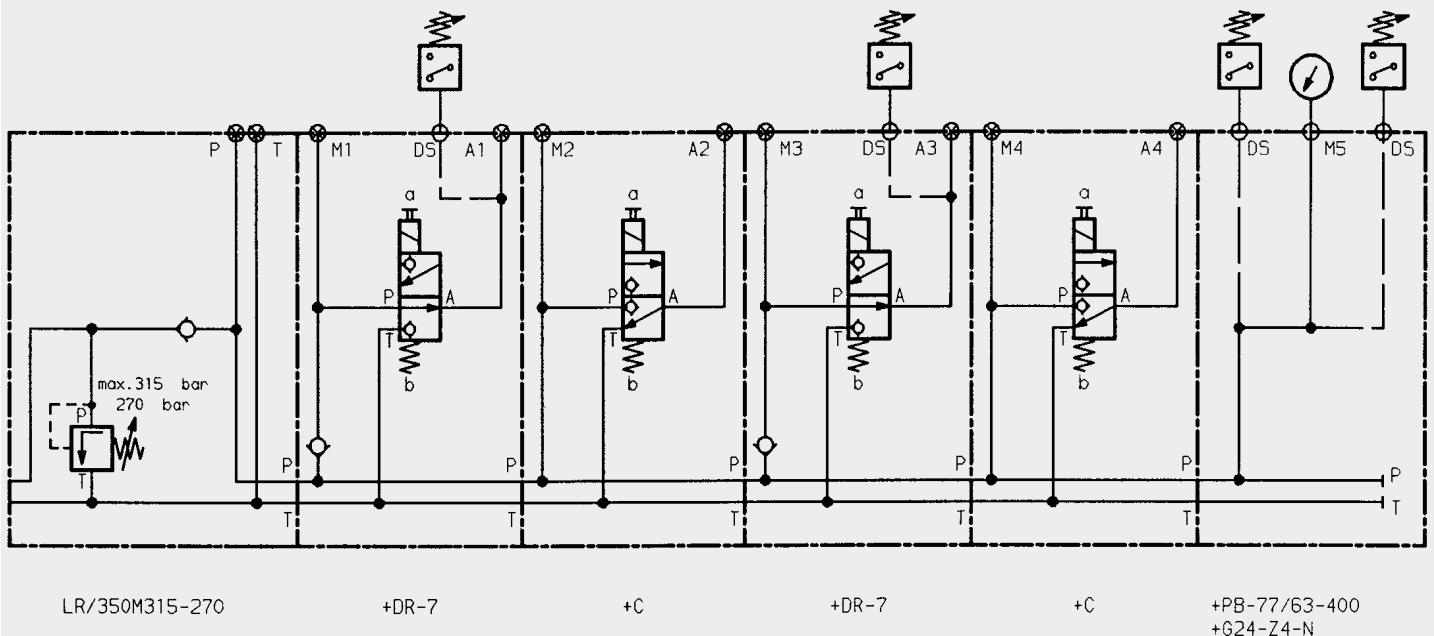
no details ... DIN 43650 without connector  
Z4 ... connector to DIN 43650-AF2-PG11  
Z5L ... large connector with light

For AC type, connector is automatically supplied with bridge rectifier insert

Manual override on directional poppet valves

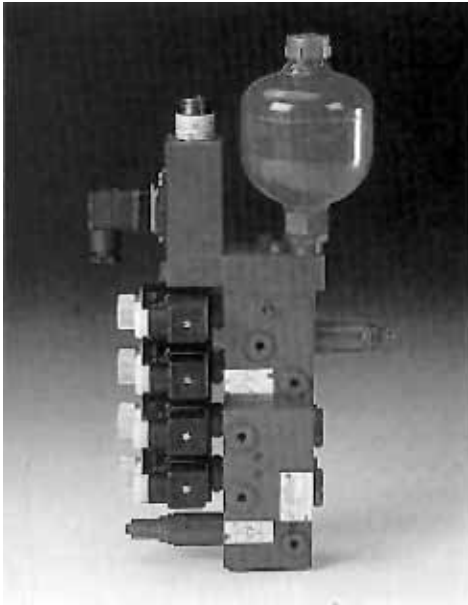
(see point 4.5.)  
no details ... without manual override  
N ... pin type operation  
NG ... thumb pressure operation  
(symbols V, W, Y, C, D only)

Circuit diagram corresponding to order example above



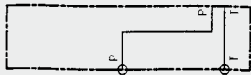
### 3.2. BASE MODULES

#### Base module RL for inline mounting

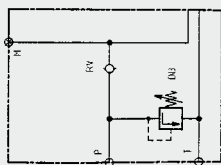


#### Name and symbol

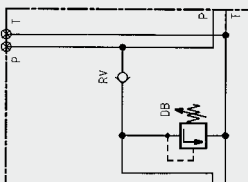
##### 3.2.1 Base module for inline mounting



##### 3.2.2 Base module for inline mounting



##### 3.2.3 Base module for flange-mounting

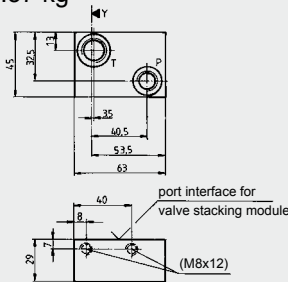


#### Base module L for flanging to CA power units

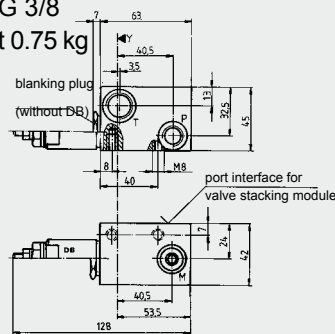


#### Dimensions

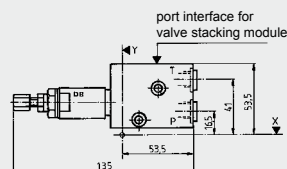
Ports  
P = G 1/4  
T = G 3/8  
Weight 0.57 kg



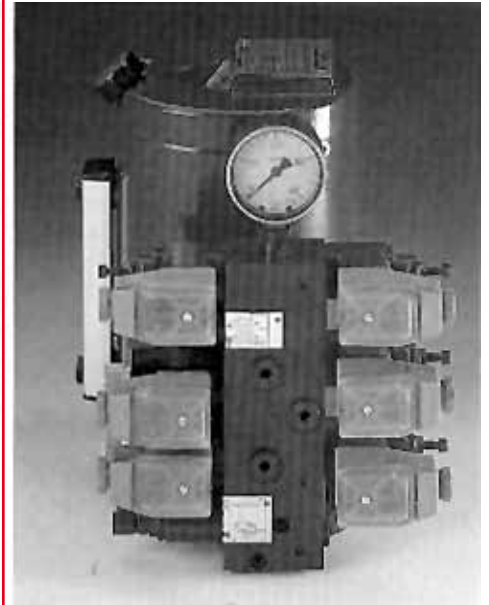
Ports  
M, P = G 1/4  
T = G 3/8  
Weight 0.75 kg



Ports  
P, T = G 1/4  
Weight 0.97 kg



#### Base module L for flanging to HP power units



#### Model code

Base module RL+  
for inline mounting

Base module RL R / 350 V+  
for inline mounting  
Check valve RV  
no details ... without  
R ... with RV  
Pressure relief valve DB  
pressure range and type of  
adjustment  
see point 4.2.

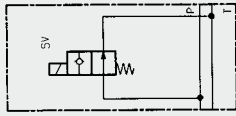
Base module L R / 350 M 315 +  
for flange-mounting  
Check valve RV  
no details ... without  
R ... with RV  
Pressure relief valve DB  
pressure range and type of  
adjustment  
see point 4.2.  
V-type adjustment not possible on this  
base module

### 3.3. FUNCTION MODULES

#### Ports A, B M ... G 1/4

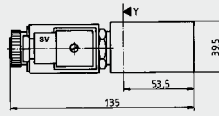
#### Name and symbol

##### 3.3.1 2/2 Directional poppet valve module



#### Dimensions

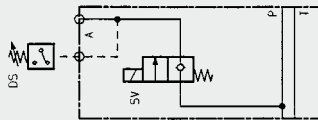
Weight 0.74 kg



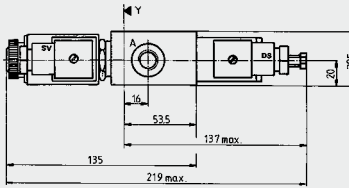
#### Model code

**Dir. poppet valve SV** ———— **+ Y +**  
possible symbols Z, Y, W, V  
see point 4.3.

##### 3.3.2 2/2 Directional poppet valve module



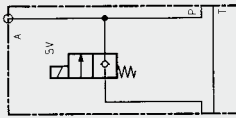
Weight 0.74 kg



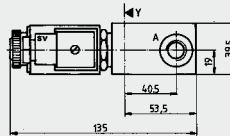
**Dir. poppet valve SV** ———— **+ Z A - 5 +**  
possible symbols Z, Y, W, V  
see point 4.3.

**Module code** ————  
**Pressure switch DS** ————  
no details ... without  
5-8 ... see point 4.4.

##### 3.3.3 2/2 Directional poppet valve module



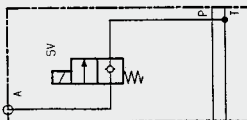
Weight 0.74 kg



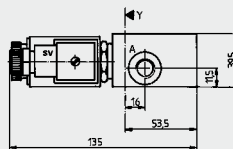
**Dir. poppet valve SV** ———— **+ Z P +**  
possible symbols Z, Y, W, V  
see point 4.3.

**Module code** ————

##### 3.3.4 2/2 Directional poppet valve module



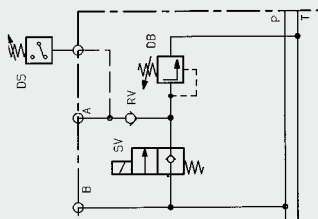
Weight 0.75 kg



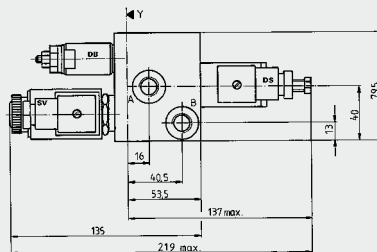
**Dir. poppet valve SV** ———— **+ Z T +**  
poss. symbols Z, Y, W, V  
see point 4.3.

**Module code** ————

##### 3.3.5 2/2 Directional poppet valve combination



Weight 1.45 kg



**Dir. poppet valve SV** ———— **+ Z R - 6 / 350 V +**  
possible symbols  
Z, Y, W, V  
see point 4.3.

**Check valve** ————  
no details ... without  
R ... with RV

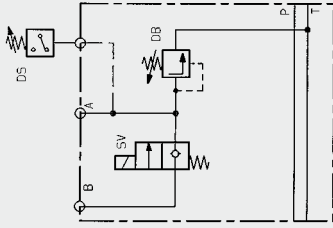
**Pressure switch DS** ————  
no details ... without  
5-8 ... see point 4.4.

**Pressure relief valve DB** ————  
**pressure range and type of adjustment**  
see point 4.2.



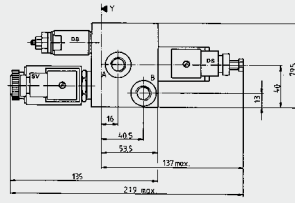
**Name and symbol**

**3.3.6 2/2 Directional poppet valve combination**



**Dimensions**

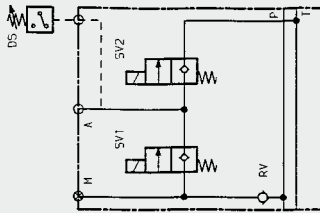
Weight 1.45 kg



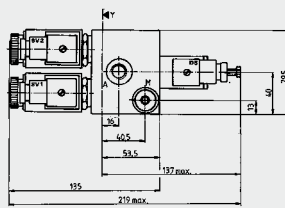
**Model code**

**Dir. poppet valve SV** + Z T - 6 / 350 V +  
 possible symbols  
 Z, Y, W, V  
 see point 4.3.  
**Module code**  
**Pressure switch DS**  
 no details ... without  
 5-8 ... see point 4.4.  
**Pressure relief valve DB**  
**pressure range and type of adjustment**  
 see point 4.2.

**3.3.7 2/2 Directional poppet valve combination**

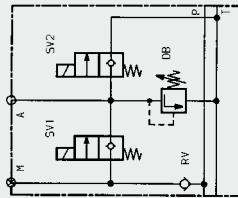


Weight 1.48 kg  
 DS – series 5-8

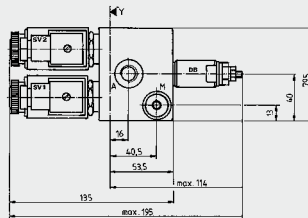


**Module code** + E R Z Z - 3 +  
**Check valve**  
 no details ... without  
 R ... with RV  
**Dir. poppet valve SV1**  
**Dir. poppet valve SV2**  
 possible symbols for  
 SV1 and SV2: Z, Y, W, V  
 see point 4.3.  
**Pressure switch DS**  
 no details ... without  
 5-8 ... see point 4.4.

**3.3.8 2/2 Directional poppet valve combination**

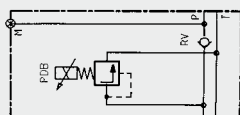


Weight 1.45 kg

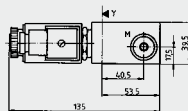


**Module code** + E R Z Z / 350 V +  
**Check valve**  
 no details ... without  
 R ... with RV  
**Dir. poppet valve SV1**  
**Dir. poppet valve SV2**  
 possible symbols for  
 SV1 and SV2: Z, Y, W, V  
 see point 4.3.  
**Pressure relief valve DB**  
**pressure range and type of adjustment**  
 see point 4.2.

**3.3.9 Pressure relief valve module**



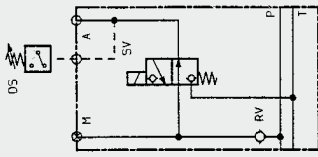
Weight 0.74 kg



**Module code** + M R P 210 A +  
**Check valve RV**  
 no details ... without  
 R ... with RV  
**Pressure relief valve**  
 P... proportional pressure relief valve PDB  
 D... pressure relief valve DB 4 (not illustrated)  
**Pressure range**  
 code P:  
 70 (... 70 bar)  
 210 (... 210 bar)  
 350 (... 350 bar)  
 code D: see point 4.2.  
**Code**  
 Control amplifier for code P (PDB)  
 A... Z4, without control amplifier  
 B... plug amplifier  
 C... module can be clipped to DIN rails  
 D... 19" Euro card  
 For type of adjustment for code D (DB4) see point 4.2.

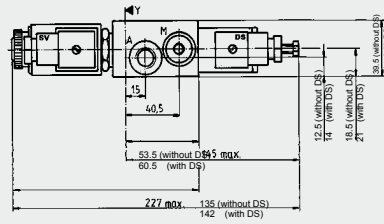
**Name and symbol**

**3.3.10 3/2 Directional poppet valve module**



**Dimensions**

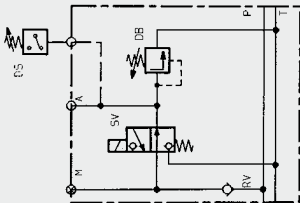
Weight 0.71 kg  
DS – series 5-8



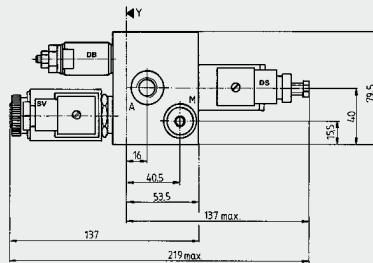
**Model code**

\_\_\_\_\_ + D R - 2 +  
**Direct. poppet valve SV** \_\_\_\_\_  
 possible symbols C, D  
 see point 4.3.  
**Code** \_\_\_\_\_  
 no details ... without  
 \_\_\_\_\_ additional elements  
 B ... orifice / Ø in mm  
 R ... check valve RV  
**Pressure switch DS** \_\_\_\_\_  
 no details ... without  
 5–8 ... see point 4.4.

**3.3.11 3/2 Directional poppet valve module**

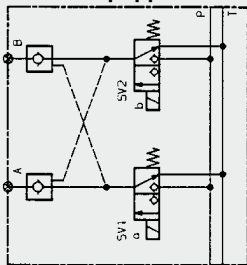


Weight 1.47 kg

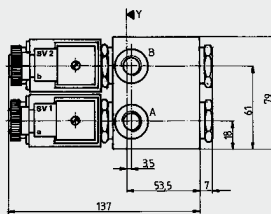


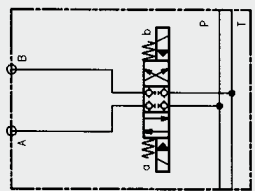
\_\_\_\_\_ + D R - 5 / 350 V +  
**Dir. poppet valve SV** \_\_\_\_\_  
 possible symbols C, D  
 see point 4.3.  
**Code** \_\_\_\_\_  
 no details ...  
 \_\_\_\_\_ without additional elements  
 B ... orifice / Ø in mm  
 R ... check valve RV  
**Pressure switch DS** \_\_\_\_\_  
 no details ... without  
 5–8 ... see point 4.4.  
**Pressure relief valve DB** \_\_\_\_\_  
**pressure range and type of adjustment**  
 see point 4.2.

**3.3.12 4/3 Directional poppet valve module**

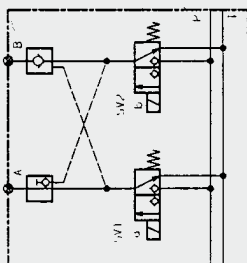


Weight 2.16 kg

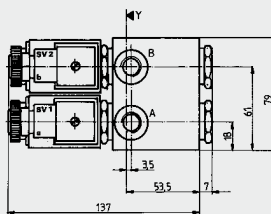


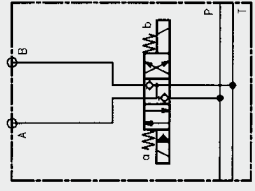
\_\_\_\_\_ + K +  
**Module code** \_\_\_\_\_  


**3.3.13 4/3 Directional poppet valve module**

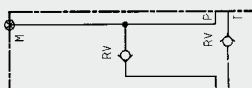


Weight 2.16 kg

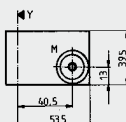


\_\_\_\_\_ + L +  
**Module code** \_\_\_\_\_  


**3.3.14 Check valve module**



Weight 0.79 kg

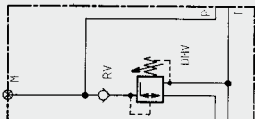


\_\_\_\_\_ + R PT +  
**Module code** \_\_\_\_\_  
**Code** \_\_\_\_\_  
**Check valve RV**  
 P ... RV in P line  
 T ... RV in T line  
 PT ... RV in P and T line  
 Cracking pressure  $p_0 = 0.5$  bar



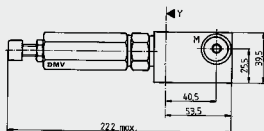
**Name and symbol**

**3.3.15 Pressure reducing module**



**Dimensions**

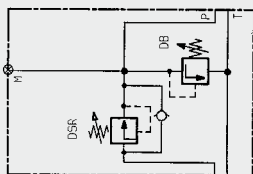
Weight 0.7 kg



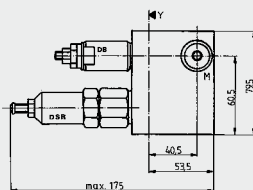
**Model code**

Module code **+ RM 140 V 40 R+**  
**Pressure range pressure reducing valve DMV**  
 50 (... 50 bar)  
 140 (... 140 bar)  
**Type of adjustment DMV**  
 V ... Allen head  
 H ... hand wheel  
 A ... lockable, type 2H lock  
 see point 4.6.  
**Setting pressure DMV**  
 no details ... valve not set (spring relaxed)  
**Check valve RV**  
 no details ... without  
 R ... with RV

**3.3.16 Pressure reducing module**

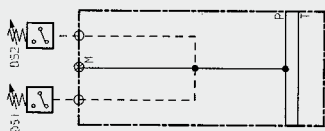


Weight 1.53 kg

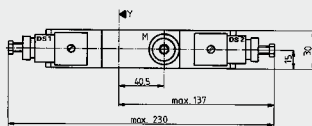


Module code **+ H 350 V 290 / 350 V +**  
**Pressure range pressure reducing valve DSR**  
 100 (... 100 bar)  
 250 (... 250 bar)  
 350 (... 350 bar)  
**Type of adjustment DSR**  
 V ... Allen head  
**Pre-set closing pressure DB pressure range and type of adjustment**  
 see point 4.2.

**3.3.17 Pressure switch module**



Weight 0.6 kg  
 DS – series 5–8

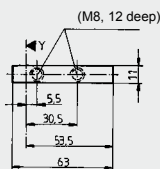


Module code **+ G - 3 3 +**  
**Pressure switch DS1**  
 5–8 ... see point 4.4.  
**Pressure switch DS2**  
 1–4 ... or  
 5–8 ... see point 4.4.  
 If only one figure is given, DS1 is removed  
 Combining series 1-4 with 5-8 is not possible.

**3.3.18 Mounting sandwich plate**



Weight 0.23 kg



Module code **+ BP +**

### 3.4. END MODULES

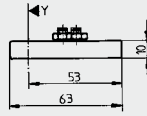
#### Name and symbol

##### 3.4.1 Standard end module



#### Dimensions

Weight 0.21 kg



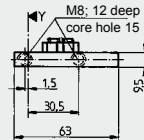
#### Model code

Module code \_\_\_\_\_ + PA

##### 3.4.2 End module with mounting thread

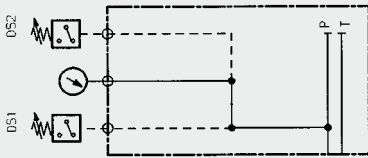


Weight 0.20 kg

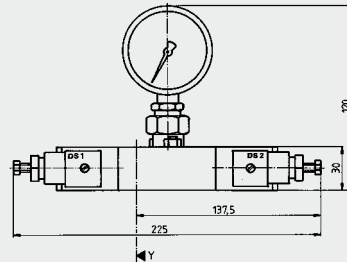


Module code \_\_\_\_\_ + PF

##### 3.4.3 End module with pressure gauge and pressure switches



Weight 0.61 kg



Module code \_\_\_\_\_ + PB - 5 5 / 63-100

**Pressure switch DS1**  
no details ... without  
5-8 ... see point 4.4.

**Pressure switch DS2**  
no details ... without  
5-8 ... see point 4.4.

If only one figure is given, DS2 is removed

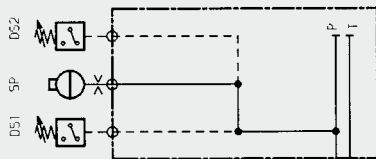
**Pressure gauge Ø 63 mm**  
no details ... without

Gauge range:  
100 bar  
160 bar  
250 bar  
400 bar  
600 bar  
1000 bar

**Note:**  
Pressure range max. 2/3 of scale range

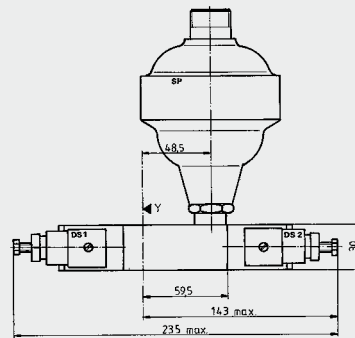
## Name and symbol

### 3.4.4 End module with accumulator and 2 pressure switches



## Dimensions

Weight 0.66 kg



## Model code

Code \_\_\_\_\_ + PC - 55 / \_\_\_\_\_

**Code** \_\_\_\_\_

**Pressure switch DS1** \_\_\_\_\_

no details ... without  
5-8 ... see point 4.4.

**Pressure switch DS2** \_\_\_\_\_

no details ... without  
5-8 ... see point 4.4.

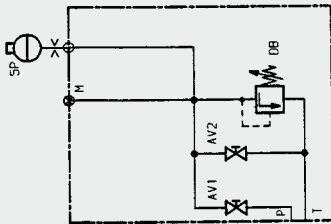
If only one figure is given,  
DS2 is removed

**Details for** \_\_\_\_\_

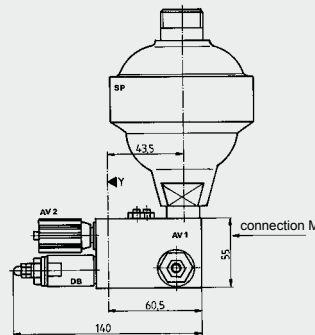
**pressure accumulator SP**  
please give full details, see point 4.1.2

All pressure accumulators  
up to Ø 96 mm can be fitted.

### 3.4.5 Accumulator safety end module



Weight 1.06 kg



Code \_\_\_\_\_ + PS 350 P 350 TÜV / \_\_\_\_\_

**Code** \_\_\_\_\_

**Pressure relief valve DB** \_\_\_\_\_

**Pressure range**  
see point 4.2.

**Pressure relief valve 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 give full details, see point 4.1.2

All pressure accumulators  
up to Ø 96 mm can be fitted.

## 4. DESIGN RECOMMENDATIONS

### 4.1. DOCUMENTATION

#### 4.1.1 Valves and units

- DB – Pressure relief valve DB 4E  
Brochure no. E 5.161
- Pressure relief valve DB 4E  
pressure-set and lead-sealed  
Brochure no. E 5.163
- PDB – Proportional pressure relief  
valve
- DMV – Pressure reducing valve  
DMVE-G 1/2  
Brochure no. E 5.162
- AV – Flow control valve AV 5E  
Brochure no. E 5.113
- RV – Check valve RVE  
Brochure no. E 5.176
- SV – 2/2 directional poppet valve  
WSM06020  
3/2 directional poppet valve,  
WSM03230C and D  
Brochure no. E 5.203
- DS – Pressure switch  
Series 1–4  
Series 5–8
- ERV – Pilot-operated check valve  
ERVE-R 1/2  
Brochure no. E 5.172
- DSR – Pressure reducing valve DSR 5E

#### 4.1.2 Hydraulic accumulators

The following hydraulic accumulators can be fitted (when ordering, please state type in full):

Diaphragm accumulators,  
weld or screw type: SBO  
Brochure no. E 3.100

Bladder accumulators type: SB  
Brochure no. E 3.201

#### 4.1.3 Modules

The reference axes X and Y given under the heading Dimensions are for calculating the installation dimensions of a complete control. The reference axis X applies only in conjunction with HYDAC HP and CA units.

### 4.2. ORDER DETAILS FOR PRESSURE RELIEF VALVE DB

350 M 315 - 300

#### Pressure range

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

#### Type of adjustment

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

#### Max. pressure setting

Must be specified for M and SM  
Not required for A, V and P

#### Pre-set cracking pressure

Optional for M, SM, A, P and V  
(no details ... valve not set,  
spring relaxed)

#### Type of adjustment:

V



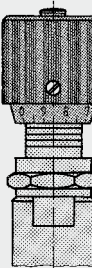
P



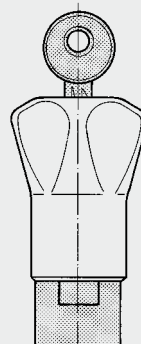
M



SM



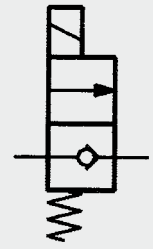
A



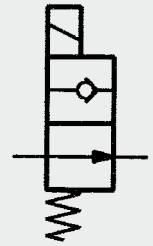
### 4.3. DIRECTIONAL POPPET VALVES

#### Symbols

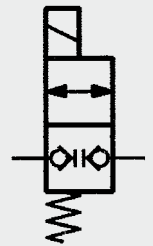
Z



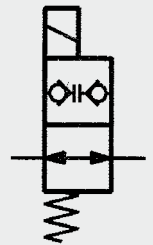
Y



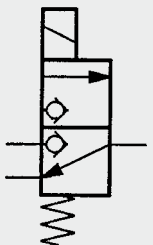
W



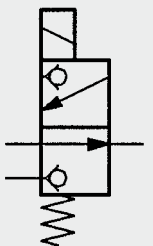
V



C



D

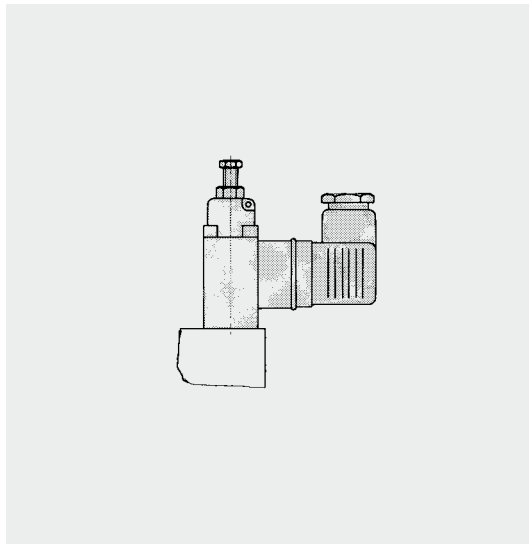


#### 4.4. ORDER DETAILS FOR PRESSURE SWITCH DS

##### 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.

#### 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.

#### 4.5. MANUAL OVERRIDE FOR DIRECTIONAL POPPET VALVES

##### N ... Push-pin type operation

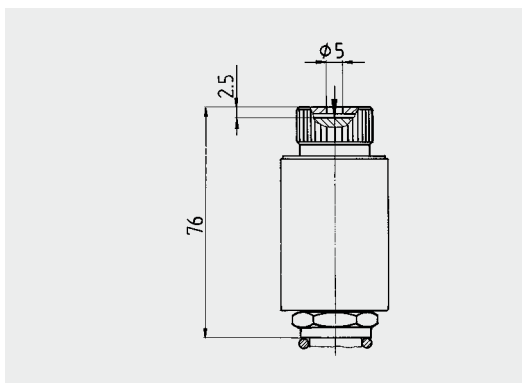
Available for symbols V, W, Y, C, D  
Mechanical operation is only possible with a pin.

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.

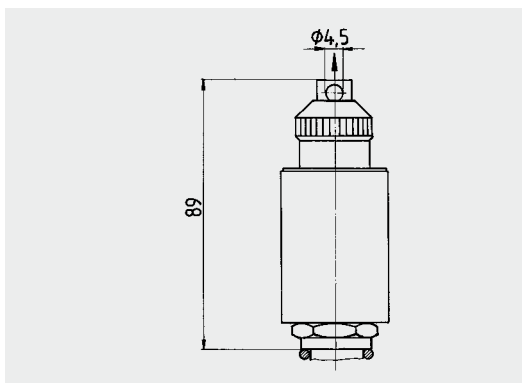


##### N ... Pull-and-hold type operation

Available for symbol Z

The valve is switched as the actuating mechanism is pulled out using an appropriate tool.

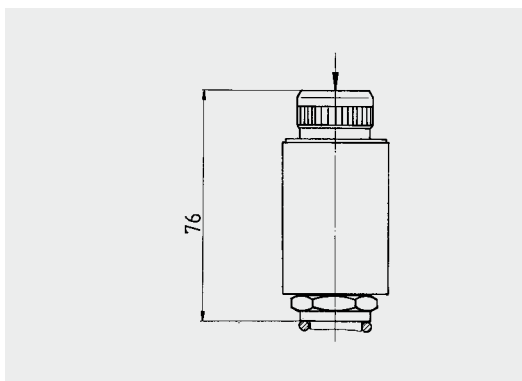
The operating stroke is 1.5 mm.



##### NG ... thumb pressure operation (rubber cap)

Available for symbols V, W, Y, C, D

Manual operation is possible without tool (thumb pressure)



#### 4.6. ORDER DETAILS FOR PRESSURE REDUCING VALVES DMV

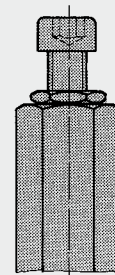
##### Type of adjustment

V ... Allen head

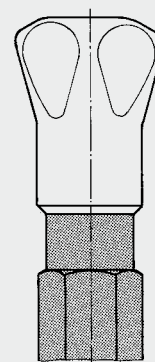
H ... hand wheel

A ... hand wheel lockable, type 2H lock

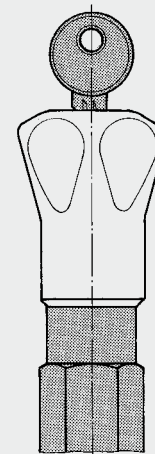
V



H



A



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