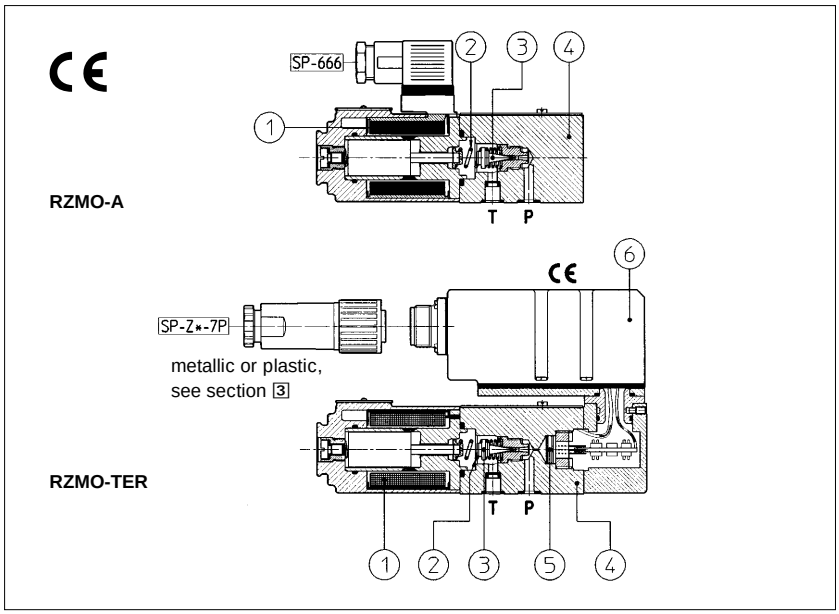
**Atos spa**
21018 Sesto Calende, Italy - Fax 0331 920005



# Proportional pressure relief valves type RZMO

direct operated ISO/Cetop size 03




RZMO are poppet type proportional pressure relief valves, direct operated with pressure regulation proportional to electronic reference signals.

They operate in association with electronic drivers, see table 5, which supply the proportional valve with correct current signal to align valve regulation to the reference signal supplied to the electronic driver (which may be integral or Eurocard type).

They can be supplied in different options:

- ZO-A suitable for open loop or closed loop with external pressure transducer.
- ZO-TER with integral pressure transducer plus electronics preset in control loop featuring improved static and dynamic performances.

In this kind of valve a proportional solenoid ZO type ① operates a poppet ③ by means of a spring ② inside the valve body ④.

The ZO-TER versions are equipped with integral pressure transducer ⑤ and electronics ⑥, which realizes the pressure closed loop control inside the valve. This allows higher dynamic performances, eliminates hysteresis and the linearity errors of the valve.

In the-TER versions the integral construction and factory presetting ensure fine functionality plus valve-to-valve interchangeability and simplified wiring and installation.

The coils are fully plastic encapsulated (insulation class H), and valves have antivibration, antishock and weatherproof features.

Surface mounting: ISO/Cetop 03
Max flow: 6 l/min
Max pressure: 315 bar.

## 1 MODEL CODE

**RZMO – A – 010 / 315 / * ** / ***

Proportional pressure relief valves ISO/Cetop 03

**A** = for open or closed loop application
**TER** = with integral electronics and pressure transducer
See note 2 at section 4

Configuration:
**0** = Cetop 03
**10** = P and T ports

Pressure range:
**100** = 1,8-100 bar
**210** = 2.5-210 bar
**315** = 3.5-315 bar

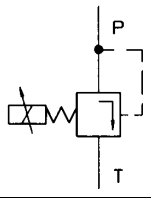
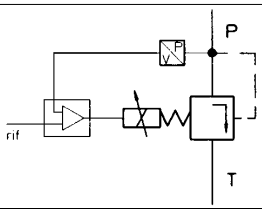
Syntethic fluids
**WG** = water-glycol
**PE** = phosphate ester

Design number

Options for -A versions:
**6** = with 6 Vdc coil instead of standard12 Vdc coil
**18** = with 18 Vdc coil instead of standard12 Vdc coil

Options for -TER versions:
**I** = current reference signal 4÷20 mA
**M** = monitor output

## 2 HYDRAULIC CHARACTERISTICS (1) - see notes at section 4

| Hydraulic symbols | |  | | |  | | |
|---|---|---|---|---|---|---|---|
| Valve model | | **RZMO-A** | | | **RZMO-TER** (2) | | |
| Max regulated pressure (Q=1 l/min) | [bar] | 100 | 210 | 315 | 100 | 210 | 315 |
| Min.regulated pressure (Q = 1 l/min) | [bar] | 1,8 | 2,5 | 3,5 | 1,8 | 2,5 | 3,5 |
| Max.pressure at port P | [bar] | 315 | | | | | |
| Max.pressure at port T (3) | [bar] | 210 | | | | | |
| Max.flow | [l/min] | 4 | | | 6 | | |
| Response time [ms] 0-100% signal variation (depending on installation) | | ≤ 70 | | | ≤ 55 | | |
| Hysteresis | [% of the regulated max pressure] | ≤ 1,5 | | | ≤ 0,2 | | |
| Linearity | [% of the regulated max pressure] | ≤ 3 | | | ≤ 0,5 | | |
| Repeatability | [% of the regulated max pressure] | ≤ 2 | | | ≤ 0,1 | | |

## 3 MAIN CHARACTERISTICS OF PROPORTIONAL PRESSURE REL... VALVES TYPE RZMO

| | | |
|---|---|---|
| Assembly position | | Any position |
| Subplate surface finish | | Roughness index, $\sqrt{}^{0,4}$ flatness ratio 0,01/100 (ISO 1101) |
| Ambient temperature | | From -20°C to +70°C for RZMO-A version / from 0°C to +50°C for RZMO-TER version |
| Fluid | | Hydraulic oil as per DIN 51524 ... 535 for other fluids see section 1 |
| Recommended viscosity | | 15 ÷100 mm²/s at 40°C (ISO VG 15÷100) |
| Fluid contamination class | | ISO 18/15 achieved with in line filters of 10 μm and $\beta_{10} \geq 75$ (recommended) |
| Fluid temperature | | T ≤ 80°C, if T ≥ 60°C select /PE seals |
| Coil resistance R at 20°C | | 3 ÷ 3.3 Ω for standard 12 $V_{DC}$ coil; 2 ÷ 2,2 Ω for 6 $V_{DC}$ coil; 13 ÷ 13,4 Ω for 18 $V_{DC}$ coil |
| Max solenoid current | | 2,6 A for standard 12 $V_{DC}$ coil; 3,25 A for 6 $V_{DC}$ coil; 1,5 A for 18 $V_{DC}$ coil |
| Max power | | 40 Watt |
| Relative duty factor | | Continuous rating (ED=100%) |
| Type of connector | for -A versions | Type SP-666 (plastic - black); 3 pins, cable clamp PG11, cable max. Ø 10 mm |
| | for -TER versions | Type SP-ZM-7P (metallic), 7 pins, cable clamp PG11, cable max Ø 10 mm<br>Type SP-ZH-7P (plastic), 7 pins, cable clamp PG11, cable max Ø 10 mm<br>**to be ordered separately** |
| Connectors features | | SP-666: DIN 43650 - ISO 4400; IP 65 (DIN 40050); VDE 0110C;<br>SP-ZM-7P: according to MIL-C-5015G; IP 66 (DIN 40050);<br>SP-ZH-7P: mounting dimensions according to MIL-C-5015G; IP 67 (DIN 40050); |

## 4 NOTES TO TABLES 2 AND 3

1) Typical characteristics in table 2 refer to valves coupled with Atos electronic drivers and operation with ISO VG-36 mineral oil at 50°C.
2) The integral closed loop control of -TER type valves is affected by the stiffness of the hydraulic circuit: the greater the stiffness of the circuit is, the better the perfomances are. Please contact our technical office in case of circuits with accumulators and/or with great fluid volumes and/or with long hoses.
On request are available RZMO-TR models directly derived from -TER versions with integral pressure transducer but without integral electronics. When -TR valves are used in pressure closed loop control coupled with Atos electronic drivers, performances are the same of corresponding valves -TER.
3) Setting the regulation value of the RZMO-A valve take into account the counter pressure at port T, which can alter the effective pressure value compared with the set value.

## 5 ELECTRONIC DRIVERS

Valve operation is optimized in association with Atos electronic drivers, which have factory preset electronic calibration.

| Models | Valve model | Execution (1) | Max power consumption (2) | Driver response | Reference signals (3) | Ramps (4) | Special functions (5) | Alarm (6) |
|---|---|---|---|---|---|---|---|---|
| E-MI-AC-01F | RZMO-A | I | 40W | normal | C, (A) | YES | NO | NO |
| E-BM-AC-01F | | B | 50W | fast | C | YES | NO | NO |
| E-RP-AC-01F | | S | 50W | fast | C, (A) | YES | NO | NO |
| E-ME-AC-01F | | E | 50W | fast | C, (A) | YES | ENABLE | NO |
| E-RI-TE-01H | RZMO-TER | X | 50W | high performance | C, (A) | NO | MONIT. (option /M) | YES |

**NOTES**
(1) Execution, Format/Connection
I = plug DIN 43650-IP65, VDE 0110 direct on solenoid
B = fast plug in standard undecal base housing, relay type
S = sealed box with cable clamp binding screw type
E = Eurocard 100x160 mm (plug in unit DIN 41494)
X = sealed box on the valve;IP65 - DIN 40050
(2) Power supply at 24 $V_{DC}$ ± 10%
(3) Reference signals
A (option/I)= 4÷20 mA
0÷20 mA (only for E-MI)
C = 0÷10 $V_{DC}$ or
0÷5 $V_{DC}$ (not available for E-RI)
(4) Ramps options, i.e. control of rapidity on rise and fall of supply current and consequently of hydraulic parameters
(5) Enable: to allow driver operation only with an electric enabling signal.
Monitor (/M option): value of regulated pressure (0÷10 $V_{DC}$)
(6) Options to monitor anomalous operating conditions of driver

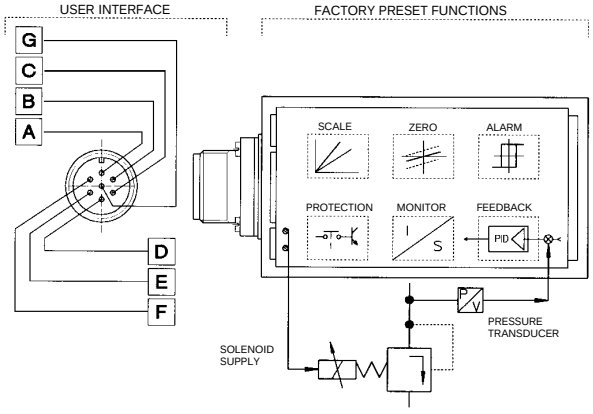
## 6 E-RI-TE-01H ELECTRONIC DRIVER INTEGRAL IN RZMO-TER VALVES

The electronic box has a socket connector with 7 male pins arranged to receive the power supply and the reference signal (input) and to supply (output) the status signals, see also the technical table G200 for more characteristics. The female plug connector (metallic or plastic) type SP-Z*-7P may be supplied separately on request.
Electrical connections to reference generators must be made using shielded cables: the sheat must be connected to the power supply zero **on the generator side**. The power supply must be properly stabilized or rectified and filtered.

| | |
|---|---|
| Format | Sealed box on the valve |
| | Protection: IP65-DIN 40050 |
| | Insulation: VDE0110 |
| Electromagnetic compatiblity (EMC) | Emission: EN 50081-2 |
| | Immunity: EN 50082-2 |
| Input signal impedence | Voltage signal : Ri ≥ 50 KΩ |
| | Current signal (option /I): Ri ≥ 316 Ω |
| Cable for plug connector SP-Z*-7P | LiYCY 7 x 0,75 mm² for 20m max length<br>7 x 1 mm² for 40m max length |

| PIN | SIGNAL DESCRIPTION | TECHNICAL SPECIFICATION |
|---|---|---|
| A | Power supply 24 $V_{DC}$ | Nominal: + 24 $V_{DC}$ |
| B | Power supply zero | Filtered and rectified: Vrms = 21 ÷ 33 (ripple max 2 Vpp) |
| C | Signal zero | Reference 0 $V_{DC}$ |
| D | Input signal + | 0 ÷ 10 $V_{DC}$ (4 ÷ 20 mA for option /I) |
| E | Input signal - | |
| F | Fault signal | Alarm = 0 $V_{DC}$; Normal working = 24 $V_{DC}$ |
| | Regulated pressure for option /M | 0 ÷ 100% ↔ 0 ÷ 10 $V_{DC}$ (Rout = 10 KΩ) |
| G | Safety lead to earth terminal | Connect only when the power supply is not conform to VDE 0551 (CEI 14/6) |

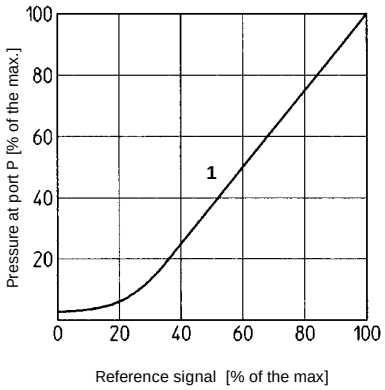
Note: electrical signals (e.g. actual - feedback signals) taken via valve electronics must not be used to switch off the machine safety functions. This is in accordance with the regolations to the European standard (Safety requirements of fluid technology systems and components - hydraulics)

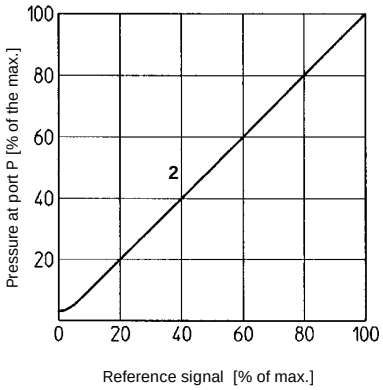


## 7 DIAGRAMS

### 7.1 Regulation diagrams
with flow rate Q = 1 l/min

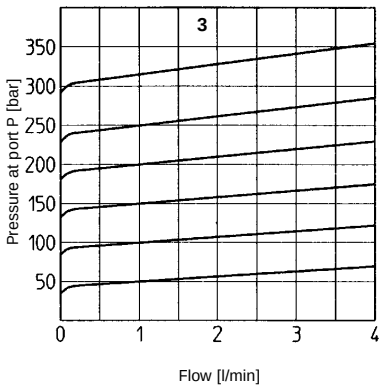
**1 =** RZMO-A
**2 =** RZMO-TER

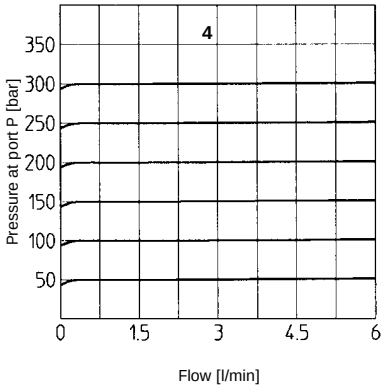



### 7.2 Pressure/flow diagrams
with reference pressure set at Q = 1 l/min

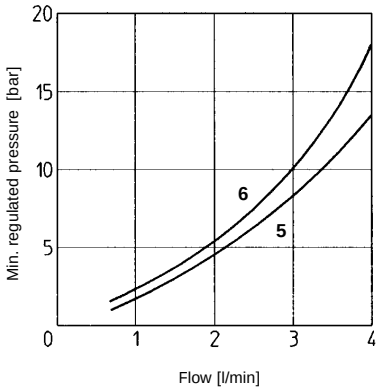
**3 =** RZMO-A
**4 =** RZMO-TER

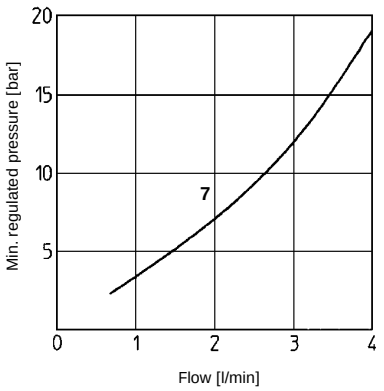



### 7.3 Min. pressure/flow diagrams
with reference signal "null"

**5 =** RZMO-*-010/100
**6 =** RZMO-*-010/210
**7 =** RZMO-*-010/315




## 8 INSTALLATION AND SET-UP

### 8.1 Warning

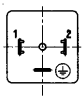
- Do not install the RZMO valves before flushing the hydraulic circuit using flushing subplates; see tables P002.
- Do not connect or disconnect electric plugs before switching-off power

### 8.2 Set-up

- fix the valve on the mounting subplate, on the manifold block or on the piloted valve/cartridge by means of fastening bolts shown in section 9 and wire electrically;
- to operate on the fastening bolts in the RZMO-TER valves it is necessary to rotate the electronics after having unlocked the grub screw Ⓚ. Once fixed the valve, retighten the grub screw Ⓚ blocking the electronic in any position;
- for RZMO-A valves execute the following regulations on the electronic driver:
  - BIAS to align the "0" reference signal to the lowest value of regulated pressure;
  - SCALE to obtain the desired correspondance between reference signal and valve regulation.

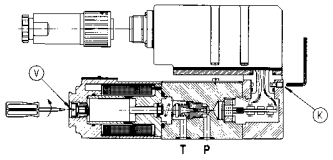
  In the RZMO-TER valves the integrated electronics is already pre-set and doesn't need further adjustment;
- bleed off the valve unloosening with a screwdriver the air bleed screw Ⓥ on the extremity of the solenoid. The presence of air in the valve causes irregularities of functioning;
- the valve is ready to work.

**ELECTRICAL WIRING FOR -A VERSIONS**




| PIN | |
|---|---|
| 1 | COIL LEAD |
| 2 | COIL LEAD |
| ⏚ | EARTH CONDUCTOR |

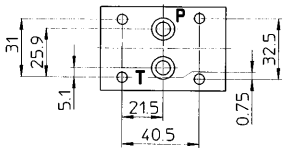
For -TER versions , see section 6



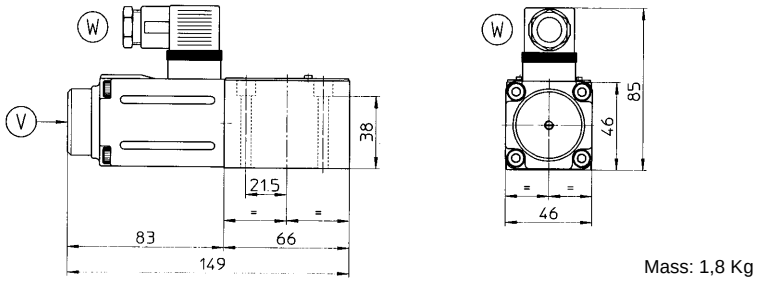
## 9 INSTALLATION DIMENSIONS [mm]

**ISO/Cetop 03**

Fastening bolts: 4 socket head screws
M5X50 bolts
Seals: 2 OR 108
Ports P, T : Ø = 5 mm

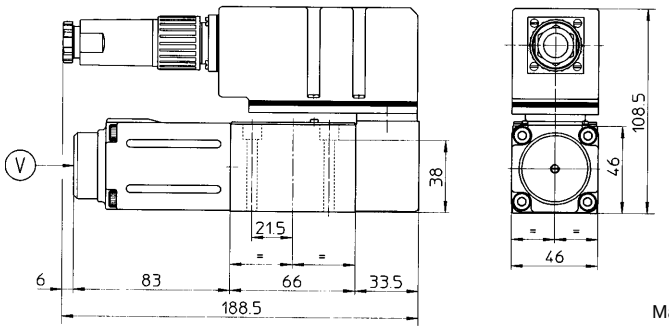



**RZMO-A**




Mass: 1,8 Kg

**RZMO-TER**




Mass: 2,4 Kg

## 10 MOUNTING PLATES

| Model | Ports location | BSP ports A-B-P-T | Ø Counterbore [mm] A-B-P-T | Mass [kg] |
|---|---|---|---|---|
| BA-202 | Ports A, B, P, T underneath | 3/8" | – | 1,2 |
| BA-204 | Ports P, T underneath; Ports A, B on lateral side | 3/8" | 25,5 | 1,8 |
| BA-302 | Ports A, B, P, T underneath | 1/2" | 30 | 1,8 |



The subplates are supplied with 4 fastening bolts M5X50. For further details see table K280