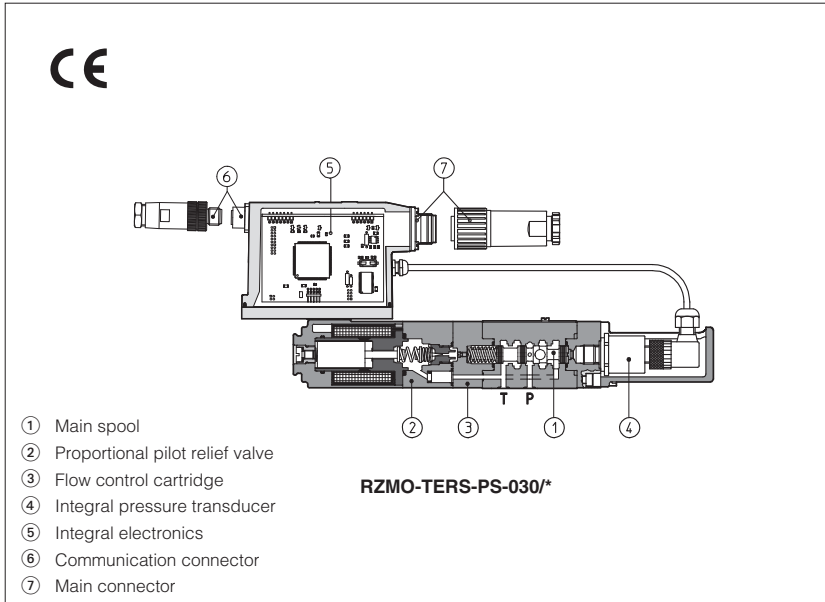


# Proportional relief valves type RZMO-TERS, AERS

pilot operated, with integral or remote pressure transducer, ISO 4401 size 06



RZMO are spool type proportional pressure relief valves, pilot operated with integral or remote pressure transducer, which provide pressure regulation proportional to electronic reference signals.

They operate in association with electronic drivers, see section 2, which supply the proportional valve with proper current to align valve regulation to the reference signal supplied to the electronic driver.

They are available in different executions:

- -TERS with integral pressure transducer ④ plus digital electronics ⑤ preset in closed loop, featuring improved static and dynamic performances.
- -AERS as -TERS but without integral pressure transducer (predisposed for connection of remote pressure transducer).

The system pressure is controlled by the main spool ①, piloted by the proportional pilot relief valve ②.

The intermediate compensated flow control cartridge ③ assures constant pilot flow and therefore high pressure stability.

The integral electronics ensures factory presetting, fine functionality plus valve-to-valve interchangeability and simplified wiring and installation.

The electronic main connector ⑦ is fully interchangeable for -TERS and -AERS. Standard 7 pin connector is used for power supply, analog input reference and monitor signals. 12 pin connector is used for option /Z.

Following communication interfaces ⑥ are available:

- -PS, Serial communication interface for configuration, monitoring and firmware updating trough Atos PL software
- -BC, CANopen interface
- -BP, PROFIBUS DP interface

The valves with -BC and -BP interfaces can be integrated into a fieldbus communication network and thus digitally operated by the machine control unit.

The coils are fully plastic encapsulated (insulation class H), and the valves have antivibration, antishock and weather-proof features.

Mounting surface: ISO 4401, size 06  
 Max flow: 40 l/min  
 Max pressure: 350 bar.

## 1 MODEL CODE

**RZMO - TERS - PS - 030 / 315 / \* \*\* / \***

Proportional pressure relief valve size 06

**TERS** = with integral digital electronics and pressure transducer

**AERS** = as TERS but predisposed for connection of remote pressure transducer (to be ordered separately, see tab. G460)

Communication interfaces:

- PS** = Serial
- BC** = CANopen
- BP** = PROFIBUS-DP

Configuration:

**030** = regulation on port P, discharge in T

Pressure range:

- 100** = 100 bar
- 210** = 210 bar
- 315** = 315 bar
- 350** = 350 bar

Seals material:  
 omit for NBR (mineral oil & water glycol)  
**PE** = FPM

Series number

**Electronics options, see section 6:**

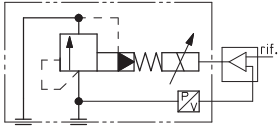
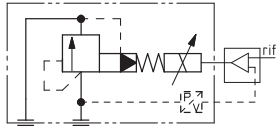
- I** = current reference input and monitor (4 ÷ 20 mA) signals
- Z** = double power supply, enable fault and monitor signals (12 pin connector)
- C** = remote pressure transducer with current feedback 4÷20 mA (only for AERS executions)

## 2 ELECTRONIC DRIVERS FOR RZMO

Valve model	-TERS	-AERS
Drivers model	E-RI-TERS	E-RI-AERS
Data sheet	G205	

**Note:** for power supply and communication connector see section 11

### 3 HYDRAULIC CHARACTERISTICS (based on mineral oil ISO VG 46 at 50 °C)

Hydraulic symbols									
		RZMO-TERS-030				RZMO-AERS-030			
Valve model		RZMO-TERS, RZMO-AERS							
Max. regulated pressure (Q = 10 l/min)		100	210	315	350				
Min. regulated pressure (Q = 10 l/min)	[bar]	6							
Max. pressure at ports P, T	[bar]	port P = 350 bar;				port T 210 bar			
Minimum flow	[l/min]	2,5							
Maximum flow	[l/min]	40							
Response time 0-100% step signal (depending on installation) - see section 9.4	[ms]	45							
Hysteresis	[% of the max regulated pressure]	≤ 0,5							
Linearity	[% of the max regulated pressure]	≤ 1,0							
Repeatability	[% of the max regulated pressure]	≤ 0,2							
Thermal drift		zero point displacement < 1% at ΔT = 40°C							

### 4 MAIN CHARACTERISTICS OF PROPORTIONAL RELIEF VALVES

Assembly position	Any position
Subplate surface finishing	Roughness index Ra 0,4 - flatness ratio 0,01/100 (ISO 1101)
Ambient temperature	-20°C ÷ +50°C for -TERS and -AERS executions
Fluid	Hydraulic oil as per DIN 51524 ... 535 for other fluids see section 11
Recommended viscosity	15 ÷ 100 mm <sup>2</sup> /s at 40°C (ISO VG 15÷100)
Fluid contamination class	ISO 4406 class 20/18/15 NAS 1638 class 9, in line filters of 10 μm (β <sub>10</sub> ≥ 75 recommended)
Fluid temperature	-20°C +60°C (standard seals) -20°C +80°C (JPE seals)
Coil resistance R at 20°C	3 ÷ 3.3 Ω
Max solenoid current	2,6 A
Max power	40 Watt
Protection degree (CEI EN-60529)	IP67
Duty factor	Continuous rating (ED=100%)

### 5 GENERAL NOTES

RZMO proportional valve are CE marked according to the applicable Directives (e.g. Immunity/Emission EMC Directive and Low Voltage Directive).

Installation, wirings and start-up procedures must be performed according to the general prescriptions shown in table F003 and in the installation notes supplied with relevant components.

The electrical signals of the valve (e.g. monitor signals) must not be directly used to activate safety functions, like to switch-ON/OFF the machine's safety components, as prescribed by the European standards (Safety requirements of fluid technology systems and components-hydraulics, EN-982).

### 6 DIGITAL INTEGRAL DRIVERS -TERS and -AERS -OPTIONS

Standard driver execution provides on the 7 pin main connector:

**Power supply** - 24Vdc must be appropriately stabilized or rectified and filtered; a 2,5 A safety fuse is required in series to each driver power supply  
Apply at least a 10000 μF/40 V capacitance to single phase rectifiers or a 4700 μF/40 V capacitance to three phase rectifiers

**Reference input signal** - analog differential input with 0÷+10 Vdc nominal range (pin D,E), proportional to desired valve pressure regulation

**Monitor output signal** - analog output signal proportional to the actual valve pressure regulation = 0÷+10 Vdc nominal range

Following options are available to adapt standard execution to special application requirements:

#### 6.1 Option /I

It provides 4÷20 mA current reference and monitor signals instead of the standard 0÷+10 Vdc.

It is normally used in case of long distance between the machine control unit and the valve or where the reference signal can be affected by electrical noise; the valve functioning is disabled in case of reference signal cable breakage.

#### 6.2 Option /Z

It provides on 12 pin main connector the following additional features

##### Logic power supply

Separated power supply for the solenoid (pin 1, 2) and for the digital electronic circuits (pin 9, 10).

Cutting solenoid power supply allows to interrupt the valve functioning but keeping energized the digital electronics thus avoiding fault conditions of the machine fieldbus controller. This condition allows to realize safety systems in compliance with European Norms EN13849-1 (ex EN954-1).

##### Enable Input Signal

To enable the driver, supply 24Vdc on pin 3 referred to pin 2: when the Enable signal is set to zero the valve functioning is disabled (zero current to the solenoid) but the driver current output stage is still active.

##### Fault Output Signal

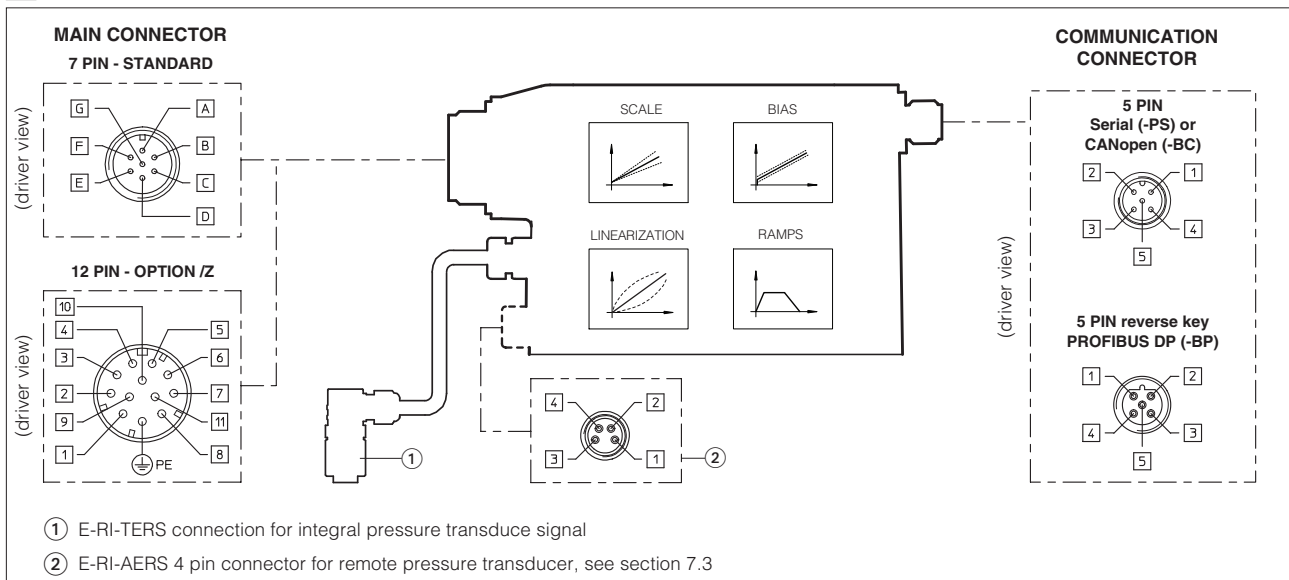
Fault output signal indicates fault conditions of the driver (solenoid short circuits/not connected, reference signal cable broken for 4÷20mA input, etc.). Fault presence corresponds to 0 Vdc, normal working corresponds to 24Vdc (pin 11 referred to pin 2): Fault status is not affected by the Enable input signal

#### 6.3 Option /C (only for -AERS version)

The valve electronics is set to receive the 4÷20 mA feedback signal from the remote pressure transducer, instead of the standard 0÷10 V.

#### 6.4 Possible combined options: /CI, /CIz, /CZ (only for -AERS) and /IZ.

## 7 DIGITAL INTEGRAL DRIVERS -TERS and -AERS -main functions and electronic connectors



### 7.1 ELECTRONIC CONNECTIONS - 7 & 12 PIN MAIN CONNECTOR

Standard 7pin	/Z option 12pin	SIGNAL	TECHNICAL SPECIFICATIONS	NOTES
A	1	V+	Power supply 24 Vdc for solenoid power stage (and for driver logic on 7 pin connection)	Input - power supply
B	2	V0	Power supply 0 Vdc for solenoid power stage (and for driver logic on 7 pin connection)	Gnd - power supply
-	3	ENABLE	Enable (24 Vdc) or disable (0 Vdc) the driver	Input - on/off signal
D	4	INPUT+	Reference analog input: $\pm 10$ Vdc maximum range Normal working range $0 \div +10$ Vdc (4 $\div$ 20 mA for /I option) differential INPUT+ and INPUT - (for 7 pin standard execution) (4 $\div$ 20 mA for /I option) common mode INPUT+ referred to AGND (only for /Z option)	Input - analog signal
E	-	INPUT -		
C	5	AGND	Ground : signal zero for MONITOR signal (pin F of 7 pin standard or pin 6 of /Z option) signal zero for INPUT+ signal (only for /Z option)	Gnd - analog signal
F	6	MONITOR	Monitor analog output: $\pm 10$ Vdc maximum range	Output - analog signal
-	7	NC	do not connect	
-	8	NC	do not connect	
-	9	VL+	Power supply 24 Vdc for driver's logic	Input - power supply
-	10	VL0	Power supply 0 Vdc for driver's logic	Gnd - power supply
-	11	FAULT	Driver status: Fault (0Vdc) or normal working (24 Vdc)	Output - on/off signal
G	PE	EARTH	Internally connected to driver housing	

**Note:** A minimum time of 270 to 590 ms have to be considered between the driver energizing with the 24 Vdc power supply and when the valve is ready to operate. During this time the current to the valve coils is switched to zero

### 7.2 ELECTRONIC CONNECTIONS - 5 PIN COMMUNICATION CONNECTORS

PIN	-PS Serial		-BC CANopen		-BP PROFIBUS DP	
	SIGNAL	TECHNICAL SPECIFICATION	SIGNAL	TECHNICAL SPECIFICATION	SIGNAL	TECHNICAL SPECIFICATION
1	NC	do not connect	CAN_SHLD	Shield	+5V	for termination
2	NC	do not connect	NC	do not connect	LINE-A	Bus line (high)
3	RS_GND	Signal zero data line	CAN_GND	Signal zero data line	DGND	data line and termination Signal zero
4	RS_RX	Valves receiving data line	CAN_H	Bus line (high)	LINE-B	Bus line (low)
5	RS_TX	Valves transmitting data line	CAN_L	Bus line (low)	SHIELD	

### 7.3 ELECTRONIC CONNECTIONS - 4 PIN REMOTE PRESSURE TRANSDUCER M8 CONNECTOR (only for AERS)

PIN	standard version		/C option (Ri = 316 $\Omega$ )	
	SIGNAL	TECHNICAL SPECIFICATION	SIGNAL	TECHNICAL SPECIFICATION
1	TR	remote trasducer pressure signal ( $0 \div +10$ Vdc)	TR	remote trasducer pressure signal (4 $\div$ 20 mA)
2	NC	reserved (do not connect)	NC	reserved (do not connect)
3	VT	remote transducer power supply +24 Vdc	VT	remote transducer power supply +24 Vdc
4	AGND	signal zero for power supply and signal	NC	reserved (do not connect)

See tab. G465 for the pressure transducer characteristics and connections.

## 8 PROGRAMMING TOOLS - see tech table GS500

Valve's functional parameters and configurations, can be easily set and optimized using Atos E-SW programming software connected to the digital driver. E-SW software is available in different versions according to the driver's communication interface: PS (Serial) E-SW-PS, BC (CANopen) E-SW-BC and BP (PROFIBUS DP). Proportional valves with fieldbus communication interface can be directly managed by the machine control unit; it is required to implement in the machine control the standard communication as described in the user manuals supplied with the relevant programming software.

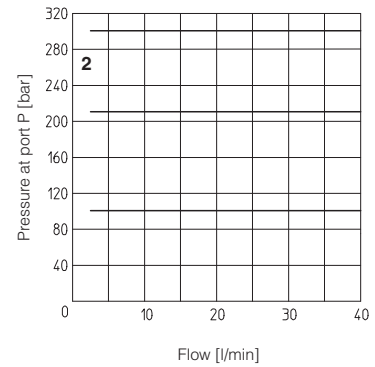
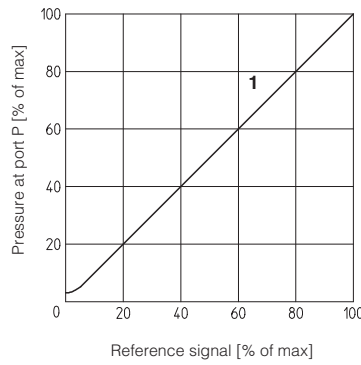
**9 DIAGRAMS** (based on mineral oil ISO VG 46 at 50 °C)

**9.1 Regulation diagrams**  
with flow rate Q = 10 l/min

1 = RZMO-TERS, RZMO-AERS

**Note:**

The presence of counter pressure at port T can affect the effective pressure regulation.

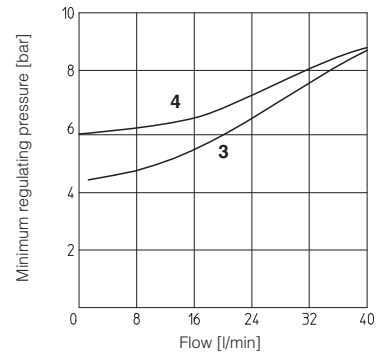


**9.2 Pressure/flow diagrams**  
with reference signal set at Q = 10 l/min

2 = RZMO-TERS, RZMO-AERS

**9.3 Minimum pressure/flow diagrams**  
with zero reference signal

3 = All the models (except /350)  
4 = All the models (only /350)



**9.4 Dynamic response**

The response times in section 3 have to be considered as average values.

The pressure variation in consequence of a modification of the reference input signal to the valve is affected by the stiffness of the hydraulic circuit: greater is the stiffness of the circuit, faster is the dynamic response. The valves dynamic performances can be optimized depending on the stiffness characteristics of the hydraulic circuit, by setting the internal software parameters. This regulation is particularly helpful in case of circuits with accumulators and/or with great fluid volumes and/or with long hoses.

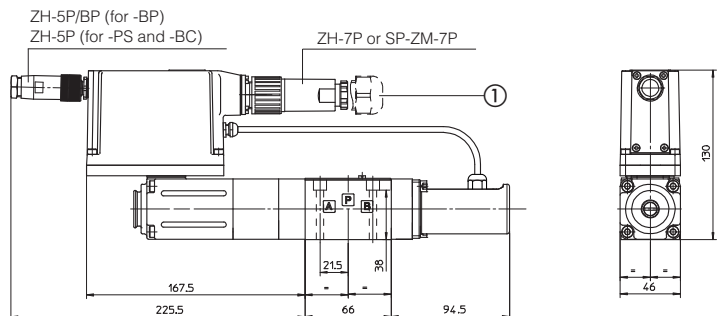
**10 INSTALLATION DIMENSIONS [mm]**

**ISO 4401: 2000**

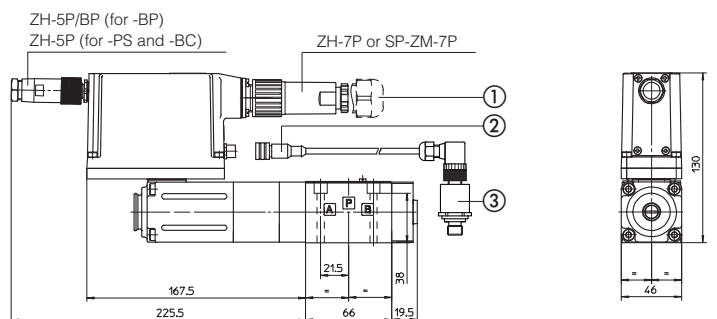
**Mounting surface: 4401-03-02-0-05**  
(see table P005)

Fastening bolts:  
4 socket head screws M5X50 bolts class 12.9  
Tightening torque = 8 Nm  
Seals: 4 OR 108  
Ports P, T: Ø = 5 mm  
Ports A, B not used

**RZMO-TERS\***  
Mass: 3,3 Kg



**RZMO-AERS\***  
Mass: 3,9 Kg



- ① = 12 pin connector ZH-12P (option/Z)
- ② = 4 pin connector ZH-4P-M8/5 (see tab. G205)
- ③ = remote pressure transducer, to be ordered separately (see tab. G465)

**11 MODEL CODES OF POWER SUPPLY AND COMMUNICATION CONNECTORS** (to be ordered separately)

VALVE VERSION	-AERS, -TERS		-AERS/Z -TERS/Z	-Serial (-PS) or CANopen (-BC)	PROFIBUS DP (-BP)	Pressure transducer only for -AERS
CONNECTOR CODE	ZH-7P	ZM-7P	ZH-12P	ZH-5P	ZH-5P/BP	ZH-4P-M8/5 (1)
PROTECTION DEGREE	IP67	IP67	IP67	IP67	IP67	IP67
DATA SHEET	G205, K500					

(1) M8 connector ZH-4P-M8/5 moulded on cable 5 mt length for pressure transducer