a Delta Power Company

TECNORD

SERVOCOMANDI E REGOLAZIONE

TRANSMISSION VALVES

Slip-in configuration

MINI SERIES
Electro-Hydraulic Control Valves / Automotive Type

STD CAVITY RANGE
Proportional Pressure Reducing-Relieving Valves / Direct Acting

MID RANGE
Proportional Press. Reducing-Relieving Valves / Step Bore Design

HIGH RANGE
Proportional Press. Reducing & ON-OFF Valves / Pilot Operated

kiwa certified
CERMET
CERTIFIED MANAGEMENT SYSTEM
Body accredited by ACCREDIA
UNI EN ISO 9001:2008
UNI EN ISO 14001:2004

Manufacturers of hydraulic cartridge valves and electro-hydraulic systems

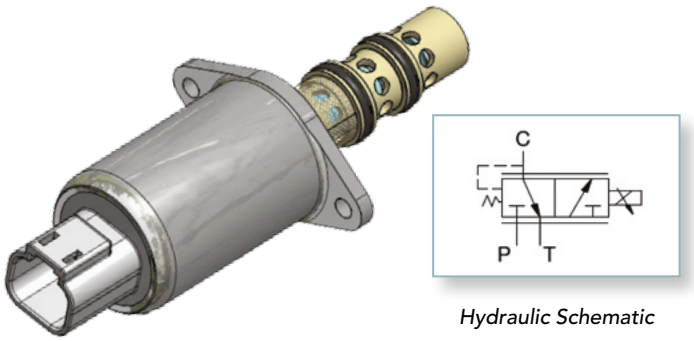
DESCRIPTION

Proportional Pressure Reducing Valves are used to generate a variable pressure in response to a PWM (Pulse Width Modulated) current signal.

PRINCIPLE OF OPERATION

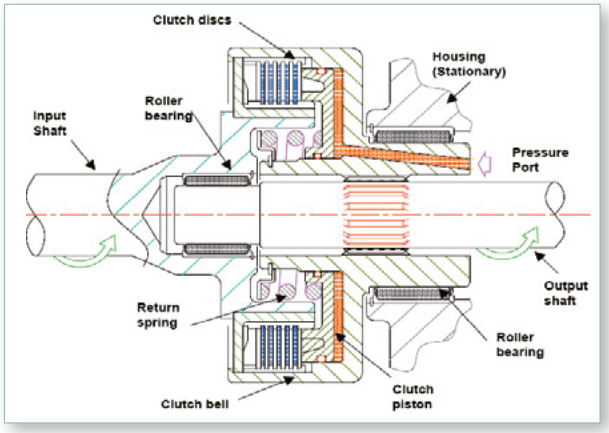
QUICK FILL-UP: a high current peak fed to the proportional solenoid of the PPRV, generates a quick shifting of the valve spool to fill up the gap between clutch discs in the shortest possible time. Clutch discs enter in touch with each other to begin to transfer torque and speed (= power) from the INPUT to the OUTPUT shaft.

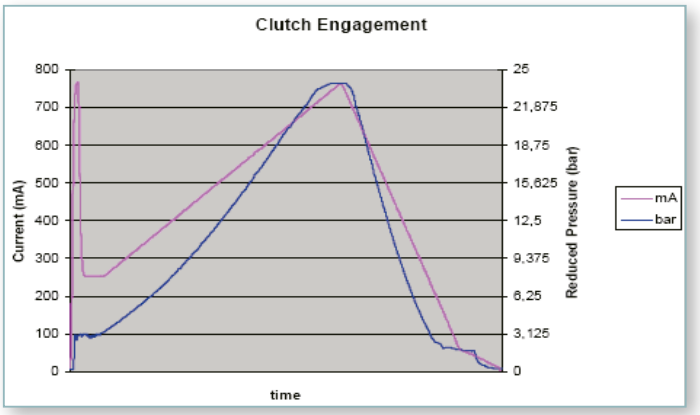
SOFT ENGAGEMENT: the PWM current signal is quickly reduced to a minimum value in order to let pressure start from the "kiss point" (2 bar) and then ramp up smoothly to a "high end" (16-18 bar) during which the torque is gradually transmitted to the driven shaft.



Hydraulic Schematic

WET DISC CLUTCH SECTIONAL VIEW

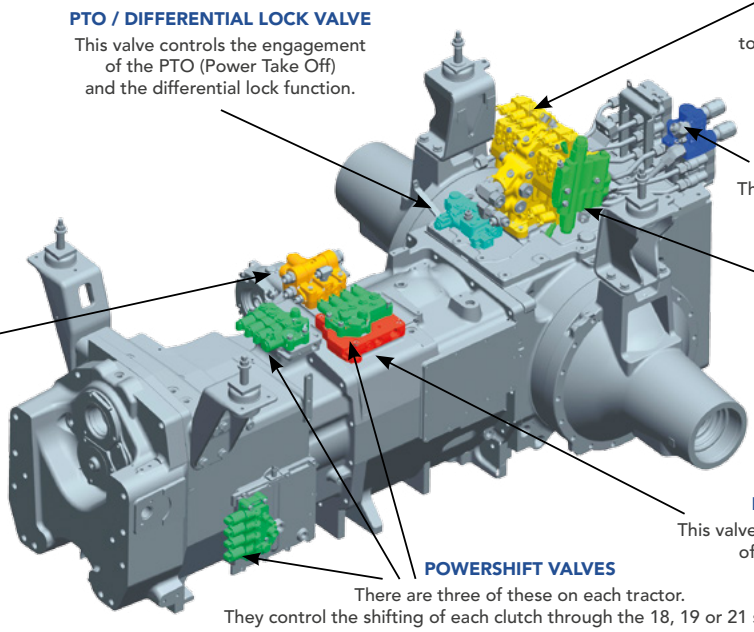




Typical clutch cycle

- Preliminary "quick fill-up" phase at top current until pressure begins to raise within the clutch piston chamber.
- Modulated current ramp to generate a "soft engagement" of clutch discs

TYPICAL LAY-OUT OF POWERTRAIN CONTROL HYDRAULICS FOR AGRICULTURAL TRACTORS



PTO / DIFFERENTIAL LOCK VALVE
This valve controls the engagement of the PTO (Power Take Off) and the differential lock function.

AUXILIARY VALVES
This valve supplies hydraulic power to implements such as planters, sprayers, plows, bailers, etc.

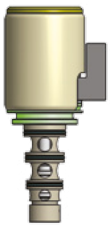
POWER BEYOND VALVE
This valve provides an additional source of hydraulic power on the tractor.

PRIORITY / REGULATOR VALVE
This valve makes sure steering always gets priority over all other hydraulic functions.
The other half of the valve maintains regulated pilot pressure at 345 psi.

HITCH VALVE
This valve controls the raising and lowering of the 3-point hitch.

INCHING VALVE
This valve controls the engagement of the master clutch.

POWERSHIFT VALVES
There are three of these on each tractor.
They control the shifting of each clutch through the 18, 19 or 21 speeds.



MOD. IP-DNR-T235-AMQ12

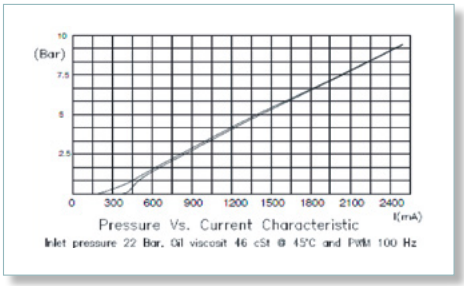
Hydraulic Specifications

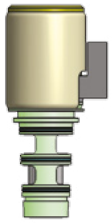
Max. Input Pressure ..... 50 bar
Max. Output Flow ..... 12 lt/min
Control Pressure Range ..... See Graph
Typical Internal Leakage ..... 15 cc/min
Cavity Tool T235

Electrical Specifications

Coil Resistance ..... 3.2 Ohms
Current Supply Characteristics ..... See Graph
Superimposed Dither Frequency ..... 150 Hz
Coil Terminations ..... Amp Micro Quadlock

Proportional Pressure Reducing Valve





MOD. IQ-2WS-T227-AMQ

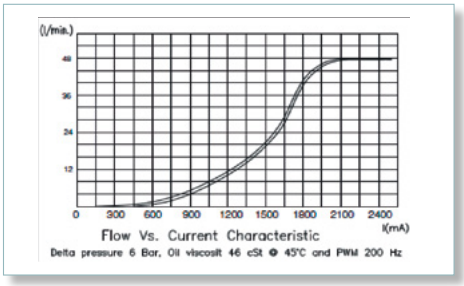
Hydraulic Specifications

Max. Input Pressure ..... 25 bar
Max. Output Flow ..... 45 lt/min
Control Pressure Range ..... See Graph
Typical Internal Leakage ..... 15 cc/min
Cavity Tool T227

Electrical Specifications

Coil Resistance ..... 3.2 Ohms
Current Supply Characteristics ..... See Graph
Superimposed Dither Frequency ..... 150 Hz
Coil Terminations ..... Amp Micro Quadlock

Proportional Flow Control Valve



MOD. IQ-4WI-T231-DT12

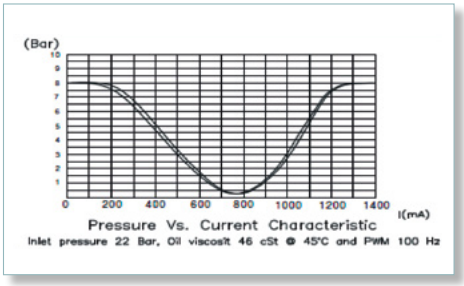
Hydraulic Specifications

Max. Input Pressure ..... 60 bar
Max. Output Flow ..... 8 lt/min
Control Pressure Range ..... See Graph
Typical Internal Leakage ..... 15 cc/min
Cavity Tool T231

Electrical Specifications

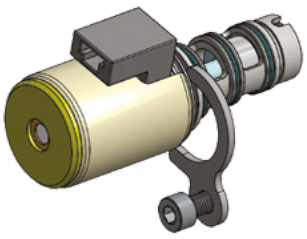
Coil Resistance ..... 5.4 Ohms
Current Supply Characteristics ..... See Graph
Superimposed Dither Frequency ..... 150-200 Hz
Coil Terminations ..... Deutsch DTO4

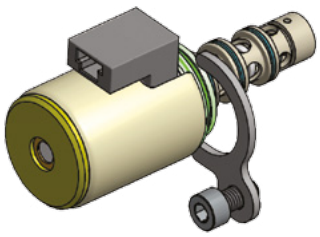
Proportional 4way-2pos Flow Control Valve



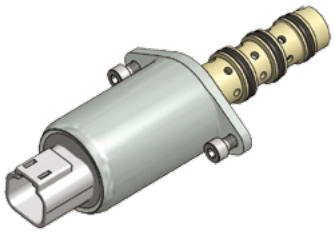
SLIP-IN VAVLVES - Mounting styles

Open Bracket/Single Bolt

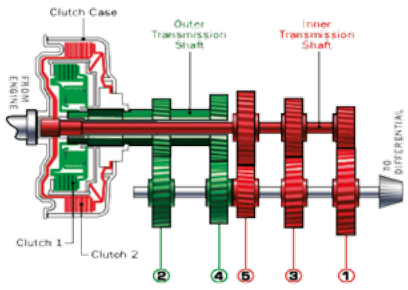


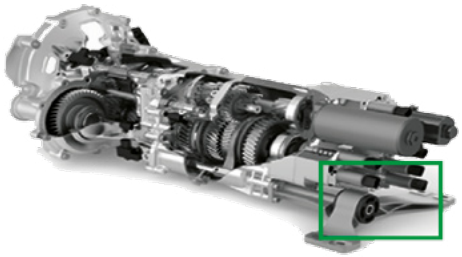


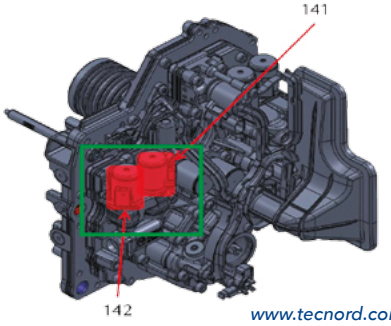
Built-in Flange/Dual Bolt



DUAL CLUTCH TRANSMISSION SCHEMATIC



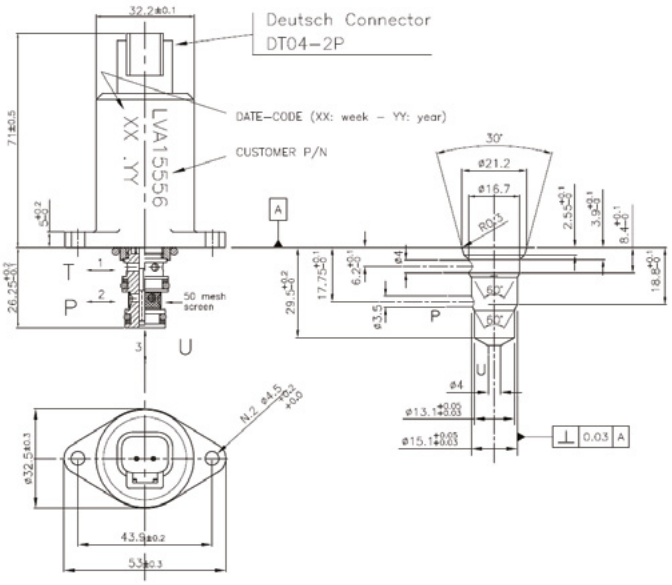




MOD. IP-DAR-T043

Hydraulic Specifications

Configuration	Direct acting / Slip-in type
Max. Input Pressure	50 bar (Std) / 350 bar (Opt)
Max. Output Flow	4 lt/min @ 6 bar Delta-P
Control Pressure Range	See Graph
Typical Internal Leakage at Rest	15 cc/min
Max. Back Pressure at T Port	50 bar
Media Operating Temp. Range	-30°C / +115°C
Oil Viscosity Range	3 cSt / 400 cSt
Max Contamination Level	18/15 (ISO 4406)
Cavity Tool	TCN T043

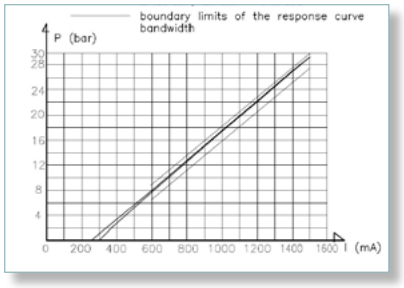


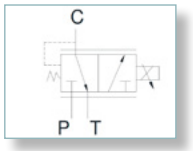
Electrical Specifications

Coil Resistance	5.4 Ohm (12 VDC) 22 Ohm (24 VDC)
Current Supply Characteristics	PWM (See Graph)
Superimposed Dither Frequency	100 / 150 Hz
Coil Terminations	Amp Junior Timer Deutsch DTO4
Environmental Protection Rating	IP69K
Duty Cycle	100% EDI

Deutsch DT04 Connector **AMP Junior Timer Connector**

Pressure (bar) vs. Current (mA) Characteristic
12 VDC coil / 5.4 Ohm / Toil = 50°C





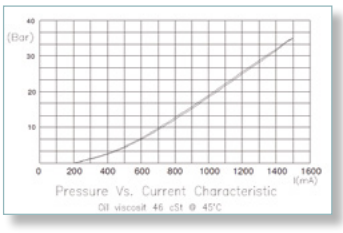
Hydraulic Schematic

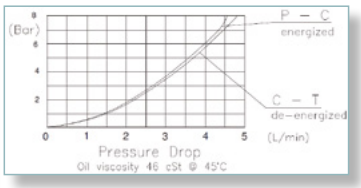
MOD. IP-DAR-250-DT

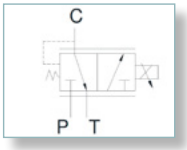
Hydraulic Specifications

Nominal Flow Rate	4 lt/min
Max. Inlet Pressure	50 bar
Controlled Pressure Range	32 bar
Media Operating Temp. Range	-30°C / +120°C
Oil Viscosity Range	3 ÷ 647 cSt
Cavity Tool	T250

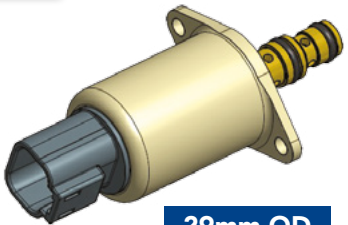
Performace curves







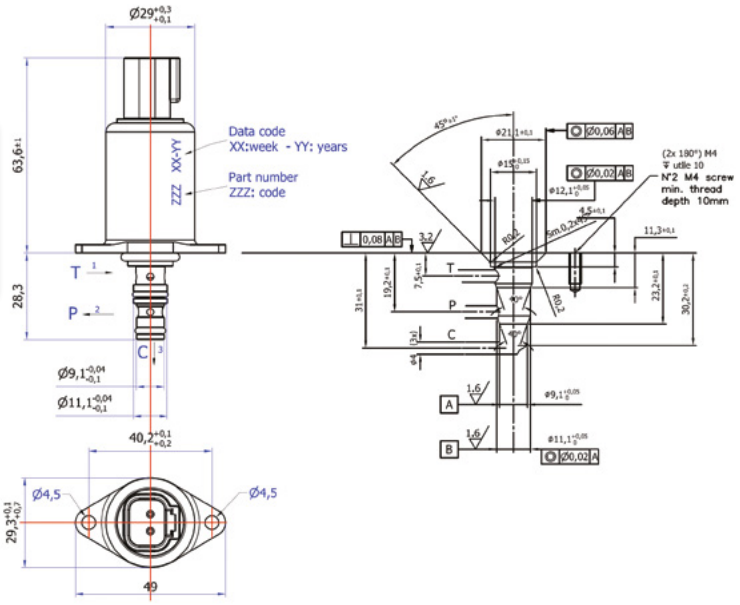
Hydraulic Schematic



29mm OD

Electrical Specifications

Coil Resistance	4.8 Ohm (12 VDC) at 20°C
Current Supply Characteristics	PWM (See Graph)
Rated Current Range 12 VDC Coil	200-1500 mAmps
Coil Terminations	Deutsch DTO4



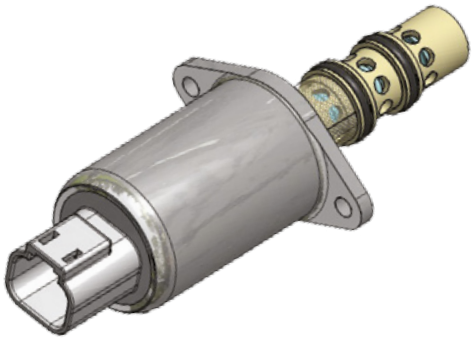
MOD. IP-RDS-T216/T222

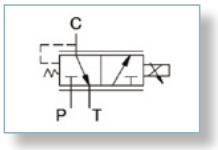
Hydraulic Specifications

Configuration	Direct acting w/Negating Rod
Max. Input Pressure	60 bar
Max. Output Flow	30 lt/min @ 4 bar Delta-P
Control Pressure Range	See Graph
Typical Internal Leakage at Rest	15 cc/min
Max. Back Pressure at T Port	25 bar (Std)
Media Operating Temp. Range	-30°C / +115°C
Oil Viscosity Range	3 cSt / 647 cSt
Max Contamination Level	18/15 (ISO 4406)
Cavity Tool	TCN T216

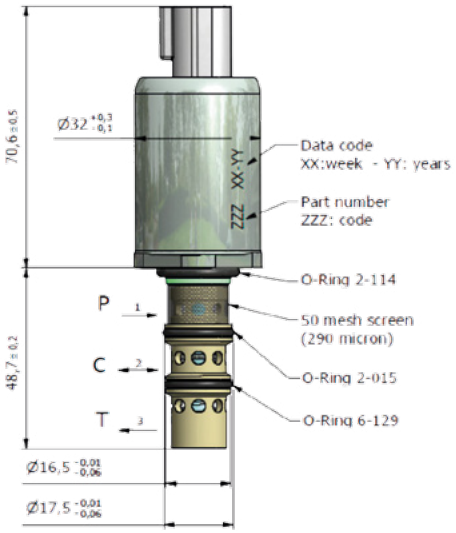
Electrical Specifications

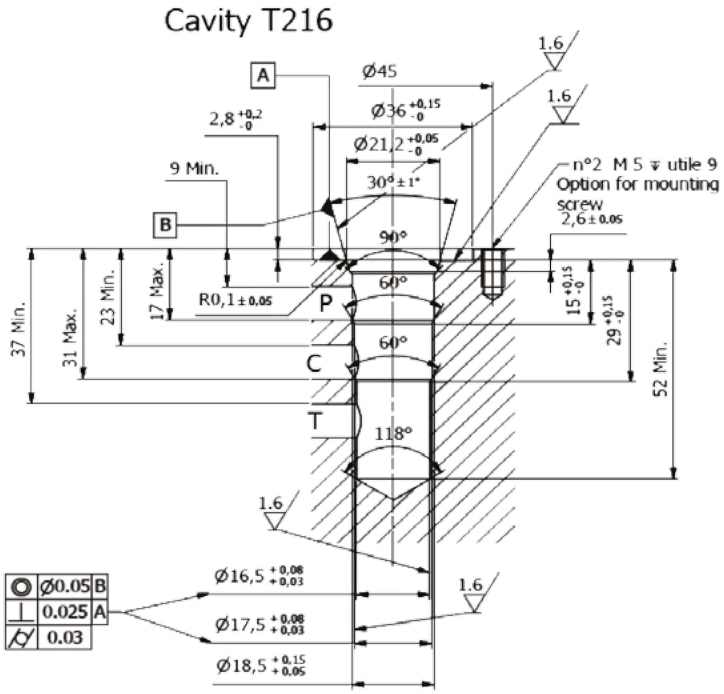
Coil Resistance	5.2 Ohm (12 VDC) 12.8 Ohm (24 VDC)
Current Supply Characteristics	PWM (See Graph)
Superimposed Dither Frequency	100 / 150 Hz
Coil Terminations	Deutsch DT04
Environmental Protection Rating	IP69K
Duty Cycle	100% EDI



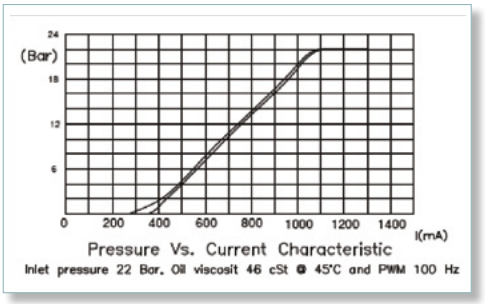


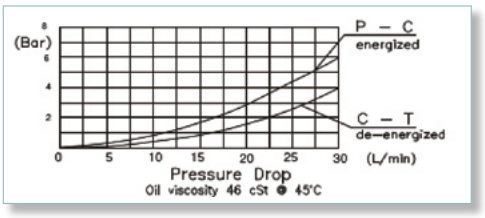
Hydraulic Schematic

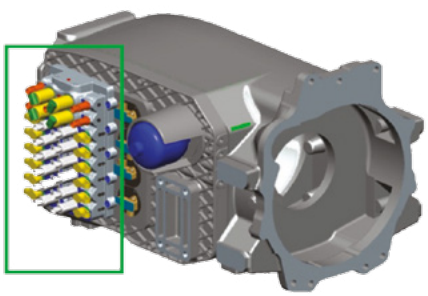


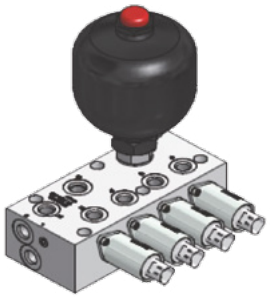


Pressure (bar) vs. Current (mA) Characteristic









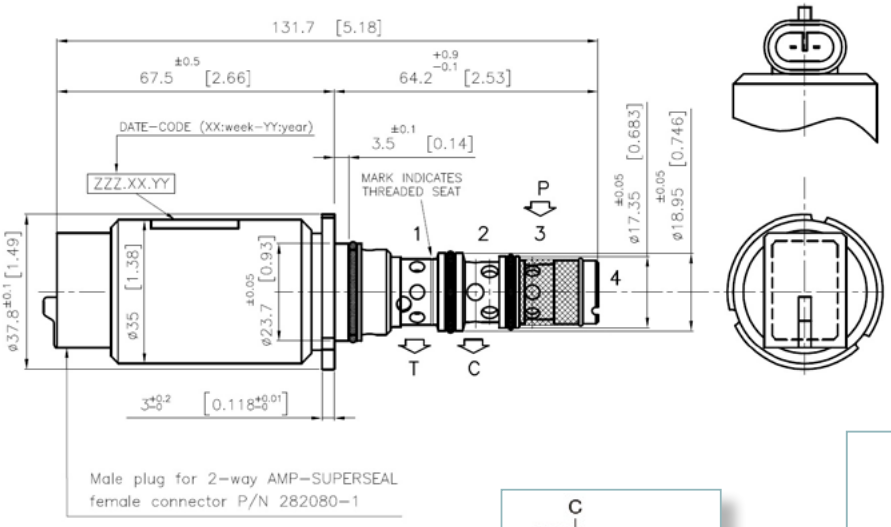
MOD. IP-PRZ-59

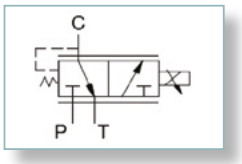
Hydraulic Specifications

Configuration	Pilot Operated
Max. Input Pressure	50 bar
Max. Output Flow	40 lt/min @ 4 bar Delta-P
Control Pressure Range	See Graph
Typical Internal Leakage at Rest	450 cc/min
Max. Back Pressure at T Port	25 bar (Std) / 350 bar (Opt)
Media Operating Temp. Range	-30°C / +115°C
Oil Viscosity Range	3 cSt / 647 cSt
Max Contamination Level	18/15 (ISO 4406)
Cavity Tool	TCN T059

Electrical Specifications

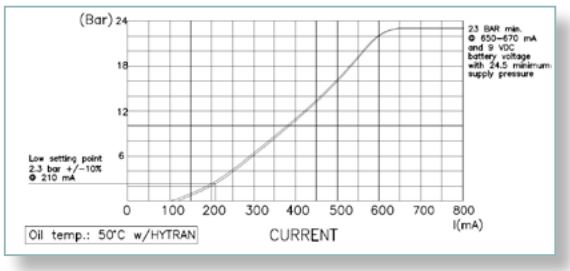
Coil Resistance	9.9 Ohm (12 VDC)
Current Supply Characteristics	PWM (See Graph)
Superimposed Dither Frequency	120 Hz ±15%
Coil Terminations	Packard MP150 (Amp Superseal Compatible)
Environmental Protection Rating	IP69K
Duty Cycle	100% EDI





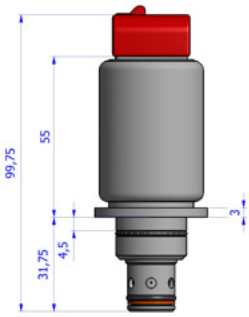
Hydraulic Schematic

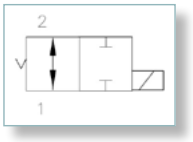
Pressure (bar) vs. Current (mA) Characteristic



HIGH RANGE ON-OFF Directional Control Valves

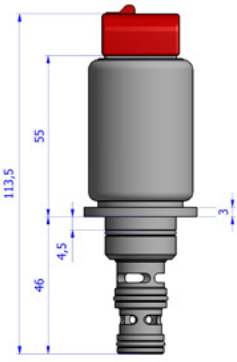
MOD. IE-S2H-T056

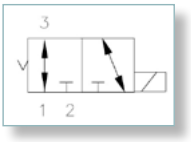




2way-2pos

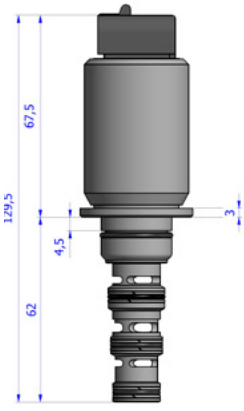
MOD. IF-S3A-T057

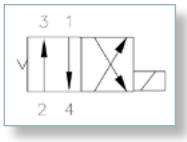




3way-2pos

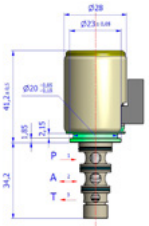
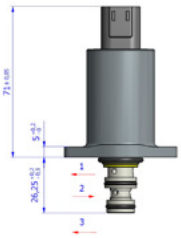
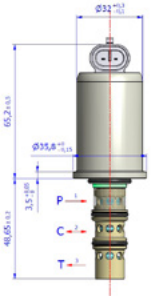
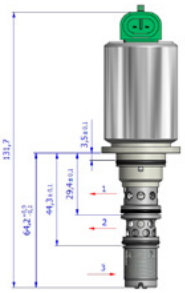
MOD. IG-S4A-T058





4way-2pos / Criss-Cross

PROPORTIONAL PRESSURE REDUCING VALVES MODELS

Function	*IP-DNR-T235*	*IP-DAR-T043*	*IP-RDS-216/222*	*IP-PRZ-T059*
Proportional Pressure Reducing Valves are designed to generate a variable pressure in response to a PWM (Pulse Width Modulated) Current Input signal				
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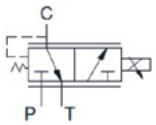				

Configuration	*MINI SERIES Slip-in Negating Rod*	*STD CAVITY Slip-in Direct acting*	*MID-RANGE Slip-in Step bore*	*HIGH-RANGE Slip-in Pilot Operated*
Pressure Control Range	0-30 bar	0-30 bar (std) / 0-45 bar (opt) 0-60 bar (opt)	0-30 bar (std) / 0-45 bar (opt) 0-60 bar (opt)	0-30 bar
Nominal Flow Rate (Press Drop <4 bar)	4 lt/min	6 lt/min	30 lt/min	35 lt/min
Leakage at rest	15 cc/min	15 cc/min	15 cc/min	450 cc/min
PWM Current Control Range @ 12 VDC	300-1400 mA (PWM)	300-1400 mA	300-1200 mA	100-750 mA
Ohmic Resistance @ 12 VDC	5.4 Ohm	3.2 Ohm	5.5 Ohm	9.9 Ohm
Coil Termination	Amp Junior Timer Deutsch DTO4	Amp Micro Quadlock	Amp Junior Timer Deutsch DTO4	Packard Metripack MP 150

APPLICATIONS

Microprocessor-controlled powershift transmissions for off-highway equipment and agricoltural tractors

CVT transmissions
(Continuosly Variable Transmission)

Anti-Block and Anti-Slip traction systems

Hi-Low transmission stages

Marine inverters

REFERENCES

CNH AG Worldwide
CNH CE Worldwide
JOHN DEERE TRACTORS USA
CARRARO TRANSMISSIONS Worldwide
ZF Germany, Italy
LUK Germany
OERLIKON GRAZIANO Italy
CONTINENTAL HYDRAULICS USA
HY-PRO HYDRAULICS USA
FUJI UNIVANCE Japan
XUANGONG China
TURK TRACTOR Turkey
TÜMOSAN Turkey
SAI HYDRAULIC MOTORS Italy
HEMA INDUSTRIES Turkey
LOVOL ARBOS GROUP China
HIDROMEK Turkey

NEW HOLLAND T7000 SERIES

CASE IH MAGNUM

STEIGER & QUADTRACK SERIES

JD DF5000 TRANSMISSION

TECNORD

ELECTRO HYDRAULIC CONTROLS

TECNORD SRL

Via Malavolti, 36 - 41122 Modena - Italy

Tel. +39 (059) 254895 - Fax +39 (059) 253512

mail: tecnord@tecnord.com

www.tecnord.com

DELTA POWER COMPANY

4484 Boeing Drive Rockford, IL 61109 - USA

Phone +1 (815) 397-6628 - Fax +1 (815) 397-2526

mail: delta@delta-power.com

www.delta-power.com

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