



ELECTRONIC CONTROL DEVICES

INDEX

Subject	Page
INTRODUCTION.....	3
ELECTRONIC CONTROL UNIT.....	4
SPEED SENSOR	6
PRESSURE SENSOR.....	8
AIR/FLUID TEMPERATURE SENSOR.	9
SWIVEL ANGULAR SENSOR MVP SERIES.....	10
SWIVEL ANGULAR SENSOR LVP SERIES	12
CONNECTORS KIT.....	14
BOOTLOADER TOOL AND DIAGNOSTIC CABLE.....	15
SERVICE TOOL SOFTWARE.....	16

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INTRODUCTION

ELECTRONIC CONTROL DEVICES

Electronic controls allow a smart management of the hydraulic power in compact mobile machines.

In combination with gear motors, Casappa electronic controls allow very efficient fan drive systems or closed loop speed regulation.

In combination with variable displacement piston pumps, Casappa has developed specific smart solutions, which provide a high level of flexibility and new functions to the system, along with energy saving.

Within these solutions the most complete offer is the CSP Casappa Smart Power System.

ADVANTAGES OF ELECTRONIC CONTROLS IN HYDRAULIC SYSTEMS:

➤ **ENERGY SAVING**

Controls can be adapted to the specific engine and working conditions

➤ **FLEXIBILITY**

Different functions depending on working conditions

➤ **SAFETY**

Alarm strategies, diagnostic functions real time monitoring of the system variables

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ELECTRONIC CONTROL UNIT

ECS200 / ECS30

New ECS200 / ECS300 Electronic control Unit:

- Robust case
- 24 pins: 2x12 poles Deutsch DTM
- 32 bit floating point Power-PC running at 120 Mhz
- 12 bit A/D converter
- Up to 2 CAN 2.0B port
- 3 Output stages with pulse-width-modulated current regulation (PWM)
- Download the software from a PC to the flash memory
- Can be used in all type of mobile operating machines (agriculture, forestry, building construction)
- The CAN BUS is available with CAN open and SAE J1939 standard
- Bluetooth Connectivity
- Hardware SIL compliant



Working conditions

Power supply	8 ÷ 32 V DC
Operating temperature	-40 ÷ 85 °C (-40 ÷ 185 °F)
Max output current	4,5 A - 12 V DC
Current consumption	< 200 mA
Short circuit immunity	Against ground Against Vbb
Reverse polarity protection	Power supply lines

EMC protection

Radiated emission	Reference standards: UNI EN 14982 • Frequency range: 30 MHz ÷ 1 GHz
Radiated immunity	Reference standards: ISO11452-2 • Frequency range: 200 MHz ÷ 1 GHz Test level: 100 V/m • Frequency range: 1 GHz ÷ 2 GHz Test level: 50 V/m
Conducted immunity	Reference standards: ISO11452-4 • Frequency range: 20 MHz ÷ 220 MHz Test level: 100 mA
Load dump protection	Reference standards: ISO 7637-2 • Test level: 123 V
Electrostatic discharge	Reference standards: ISO 10605 • ±4, ±6, ±8, ±15 kV (Indirect discharge) • ±4, ±6, ±8, ±15 kV (Air discharge)

Environmental resistance

Random noise	Reference standards: EN 60068-2-64 • ASD = 0.1g ² (RMS 3,3 g) • f = 10...1000Hz • Duration per axis (xyz): 8 h
Mechanical shock	Reference standards: EN 60068-2-29 • Type of shock: Half sine • Acceleration amplitude: = 40 g • Shock duration: 6 ms • 100 positive shocks for each axes • 100 negative shocks for each axes
IP67 Protection	Reference standards: EN 60529
IP6K9K Protection	Reference standards: ISO 20653
Temperature cycle test	Reference standards: ISO 16750-4 • Temperature: -40 ÷ 90 °C (-40 ÷ 194 °F) • Number of cycles: 30
Temperature shock test	Reference standards: ISO 16750-4 • 60min @ -40 °C (-40 °F) • 20min @ 90 °C (194 °F) • Number of cycles: 20
Prova a bassa temperatura	Reference standards: ISO 16750-4 • Temperature: -40 °C (-40 °F) • Test duration: 24 h
Prova ad alta temperatura	Reference standards: ISO 16750-4 • Temperature: 90 °C (194 °F) • Test duration: 48 h

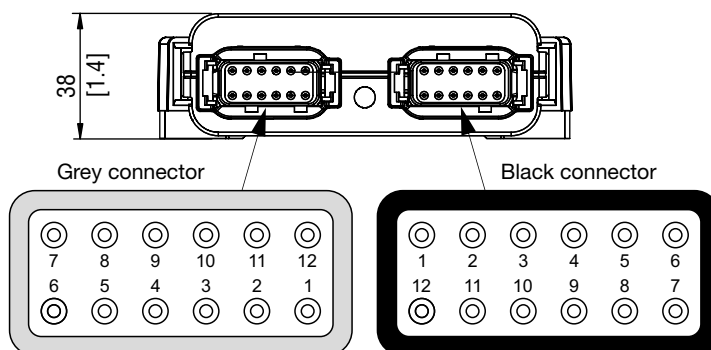
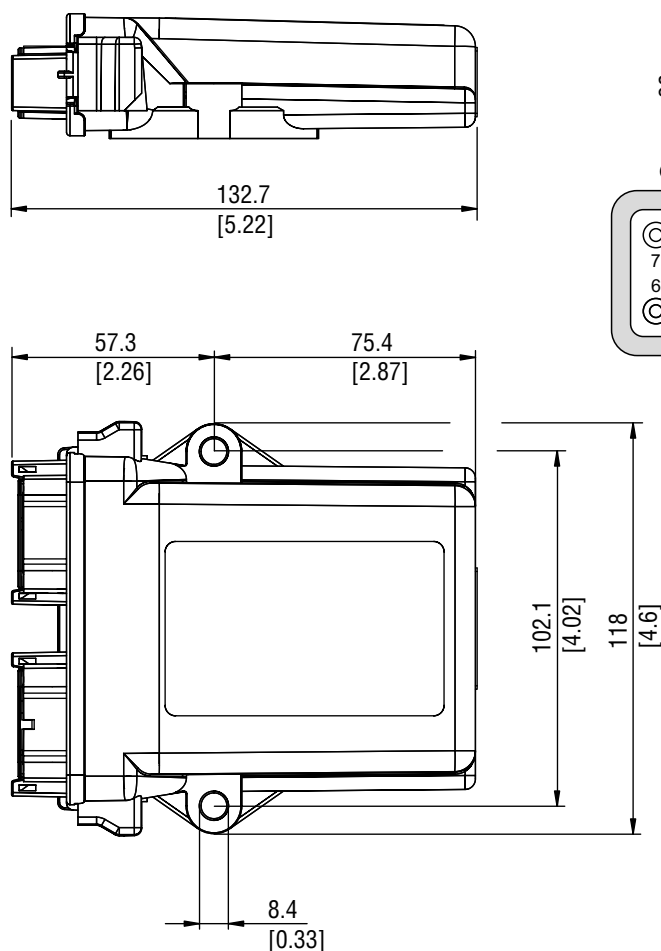
Input / Output

	ECS200	ECS300
Analog input	6	4
Temperature sensor input	2	4
Digital/Frequency input	3	3
CAN BUS	1	2
Bluetooth	No	Si
Proportional output	2 High Side drive 2A 2 Low Side drive 2A with current feedback	3 High Side drive 2A 3 Low Side drive 2A with current feedback

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ELECTRONIC CONTROL UNIT

ECS200 / ECS300



Pinout

ECS200

Grey connector		Black connector	
Pin	Function	Pin	Function
1	Analog input GND	1	N.C.
2	CAN1 HIGH	2	N.C.
3	CAN1 LOW	3	Analog input n. 6 (0 ÷ 5 V)
4	Speed sensor input (0 ÷ Power VBB)	4	Analog input n. 4 (0 ÷ 5 V)
5	Digital input n°3 (0 ÷ Power VBB)	5	Analog input n. 2 (0 ÷ 5 V)
6	Digital input n°2 (0 ÷ Power VBB)	6	Analog input n. 7 (0 ÷ 5 V)
7	Proportional output n. 1+	7	Temperature sensor T2
8	Proportional output n. 1-	8	Temperature sensor T1
9	Proportional output n. 2+	9	Analog input n. 3 (0 ÷ 5 V)
10	Proportional output n. 2-	10	Analog input n. 8 (0 ÷ 5 V)
11	N.C.	11	Power GND - CAN GND
12	N.C.	12	Power VBB

Pinout

ECS300

Grey connector		Black connector	
Pin	Function	Pin	Function
1	Analog input GND	1	CAN2 HIGH
2	CAN1 HIGH	2	CAN2 LOW
3	CAN1 LOW	3	Temperature sensor T3
4	Speed sensor input (0 ÷ Power VBB)	4	Analog input n. 4 (0 ÷ 5 V)
5	Digital input n°3 (0 ÷ Power VBB)	5	Analog input n. 2 (0 ÷ 5 V)
6	Digital input n°2 (0 ÷ Power VBB)	6	Temperature sensor T4
7	Proportional output n. 1+	7	Temperature sensor T2
8	Proportional output n. 1-	8	Temperature sensor T1
9	Proportional output n. 2+	9	Analog input n. 3 (0 ÷ 5 V)
10	Proportional output n. 2-	10	Analog input n. 8 (0 ÷ 5 V)
11	Proportional output n. 3+	11	Power GND - CAN GND
12	Proportional output n. 3-	12	Power VBB

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SPEED SENSOR

Application: Speed detection of gearwheels (for example of gear motor in fan drive systems or closed loop speed regulation).

Electrical characteristics

Power supply	A. 4,5 ÷ 24 V DC B. 12,5 ÷ 32 V DC
Frequency range	0,1 ÷ 20 kHz
Operating temperature	-30 ÷ 125 °C (-22 ÷ 257 °F)
Cable length	C. 1000 mm (39.37 in) D. 150 mm (5.91 in)
Output type	NPN
Cable	3-core, 0,34 mm ² (0.0005 in ²) unshielded
Current load	< 40 mA
Short circuit immunity	Yes, outputs against ground: outputs against power supply V _{bb} max. 50 mA
Reverse polarity protection power supply lines	Yes, at correctly wired outputs (max. 50 mA)
Output	Rectangle, 1 frequency signal, open collector, without pull-up
Output signal level	Low: < 0,6 V
Duty cycle	50 % ±10%
Insulation strenght	500 V DC
Rise / fall time	< 10 µs
Max. pressure on sensing surface	Dynamic: 275 bar (3988 psi) Static: 275 bar (3988 psi)

EMC protection

Radiated immunity	Reference standards: ISO 11452-5 • Frequency range: 20 MHz ÷ 1 GHz • Test level: 100 V/m
Radiated immunity	Reference standards: ISO 11452-2 • Frequency range: 800 MHz ÷ 2 GHz • Test level: 100 V/m
Radiated immunity	Reference standards: EN 61000-4-3 • Frequency range: 80 MHz ÷ 2 GHz Test level: 3 V/m • Frequency range: 1,4 GHz ÷ 2 GHz Test level: 3 V/m
RF common mode	Reference standards: EN 61000-4-6 • Frequency range: 150 kHz ÷ 80 MHz Test level: 3 V
Fast transients	Reference standards: EN 61000-4-4 • Test level: 2000 V • Type of coupling: capacitive
Electrostatic discharge	Reference standards: EN 61000-4-2 • ±4 kV Contact discharge • ±8 kV Air discharge
Magnetic fields	Reference standards: EN 61000-4-5 • Axis: X, Y, Z • Level: 30 A/m • Frequency points: 16 2/3 Hz; 50 Hz; 60 Hz

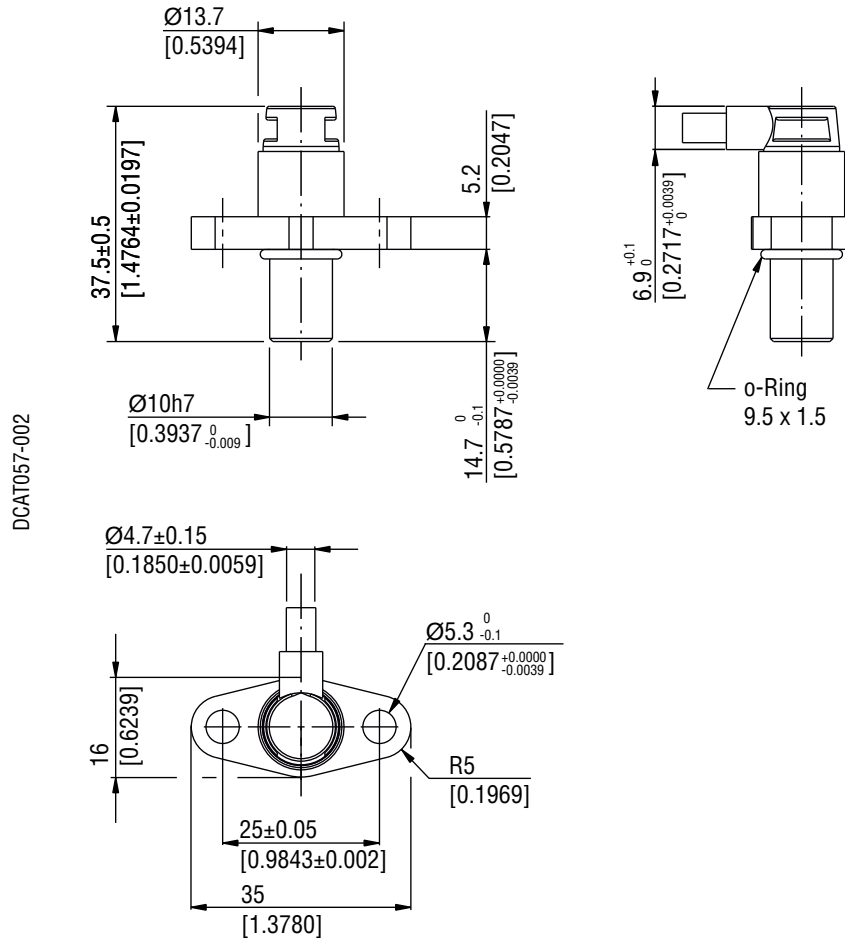


Environmental resistance

Random noise	Reference standards: EN 60068-2-64 • a= 0,05 g ² (RMS 10 g) • f= 20 ÷ 2000 Hz • Duration per axis (xyz): 5 h
Shock	Reference standards: EN 60068-2-27 • Type of shock: Half sine • Acceleration amplitude: = 100 g • Shock duration: 6 ms • Shock per axis (xyz): 12
IP67 Protection	Reference standards: EN 60529
IP6K9 Protection	Reference standards: ISO 20653
Salt spray test	Reference standards: EN 60068-2-11 • Test duration: 48 h
Temperature cycle test	Reference standards: EN 60068-2-14 • Temperature: -40 ÷ 125 °C (-40 ÷ 257 °F) • Transition time: 5 K/min • Hold time: 15 min • Number of cycles: 100
Temperature shock test	Reference standards: EN 60068-2-14 • 25 min @ 140 °C (284 °F) air • 10 min @ 20 °C (68 °F) water • Number of cycles: 20
Low temperature test	Reference standards: EN 60068-2-1 • Temperature: -40 °C (-40 °F) • Test duration: 16 h
High temperature test	Reference standards: EN 60068-2-2 • Temperature: 140 °C (284 °F) • Test duration: 16 h

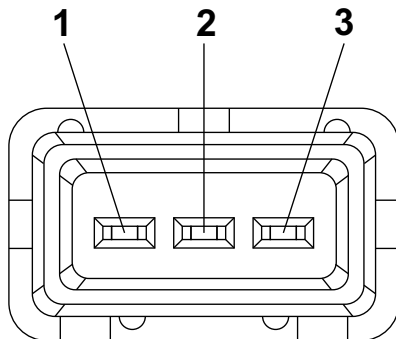
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SPEED SENSOR



Connector type

3 pin AMP Junior Timer



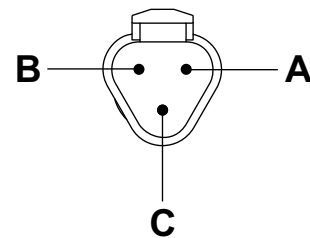
Pin Function

1	Power supply / V DC
2	Signal
3	Ground

Mating Connector: 282191-1 (TE Internal Number)

Connector type

3 pin Deutsch DT04-3P - Secondary Lock W3P



Pin Function

A	Power supply / V DC
B	Signal
C	Ground

Mating Connector: DT06-3S with secondary lock W3S

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PRESSURE SENSOR

Application: Pressure measurement in hydraulic circuits, for example for electronic load sensig control in CS Power System (CSP)

Electrical characteristics

Power supply	8 ÷ 30 V DC
Output signal	0,5 ÷ 4,5 V
EMC	EN 61000-6-2 Cable < 30 m (1181 in)
Electrical performance comply with	ISO 7637
Electrical connection	AMP superseal 1,5
Accuracy (incl. nonlinearity, hysteresis and repeatability)	± 0,5 % FS

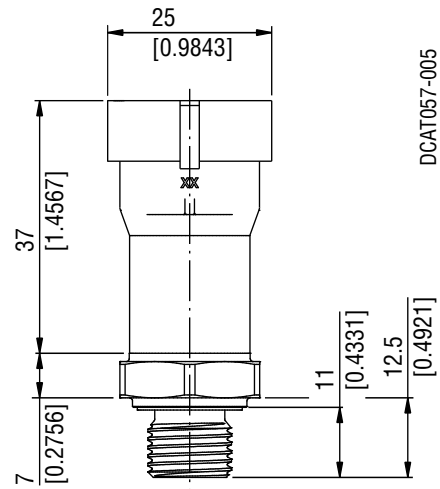
Mechanical characteristics

Pressure connection	G1/4" male - DIN 3852-E
Max pressure	400 bar (5800 psi)
Vibration resistance	EN60068-2-6
Shock resistance	100 g EN 60068-2-27
Operating temperature	-40 ÷ 100 °C (-40 ÷ 212 °F)
Ingress protection	IP67 with mating connector mounted



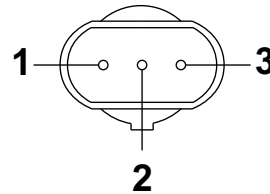
Ordering code

44091008



Electrical connection

Pin	Function
1	Signal
2	Ground
3	Power supply / V DC



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AIR/FLUID TEMPERATURE SENSOR

Application: Temperature measurement of cooling fluids, hydraulic oils, engine oil or ambient temperature in mobile machines.

Electrical characteristics

Type	Thermistor
Resistive element	NTC
Resistance	500 Ohm at 25 °C (77 °F) 16325 Ohm at 0 °C (32 °F)
Connector	Amp Junior Power Timer

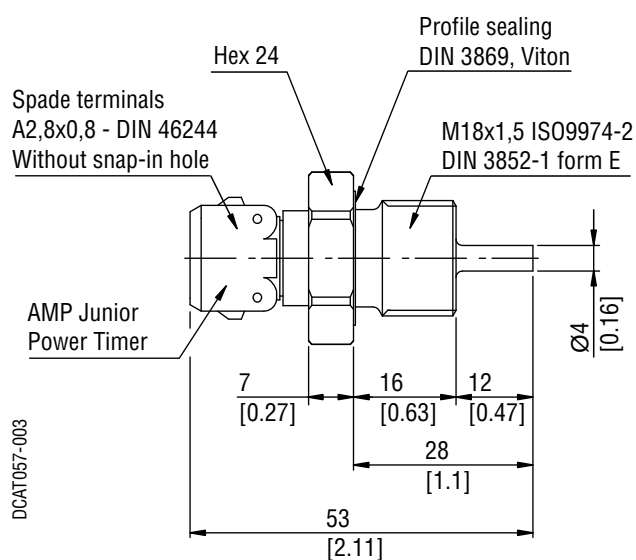
Environmental characteristics

Operating temperature	-40 ÷ 150 °C (-40 ÷ 302 °F)
Ingress protection	IP67 with mating connector mounted

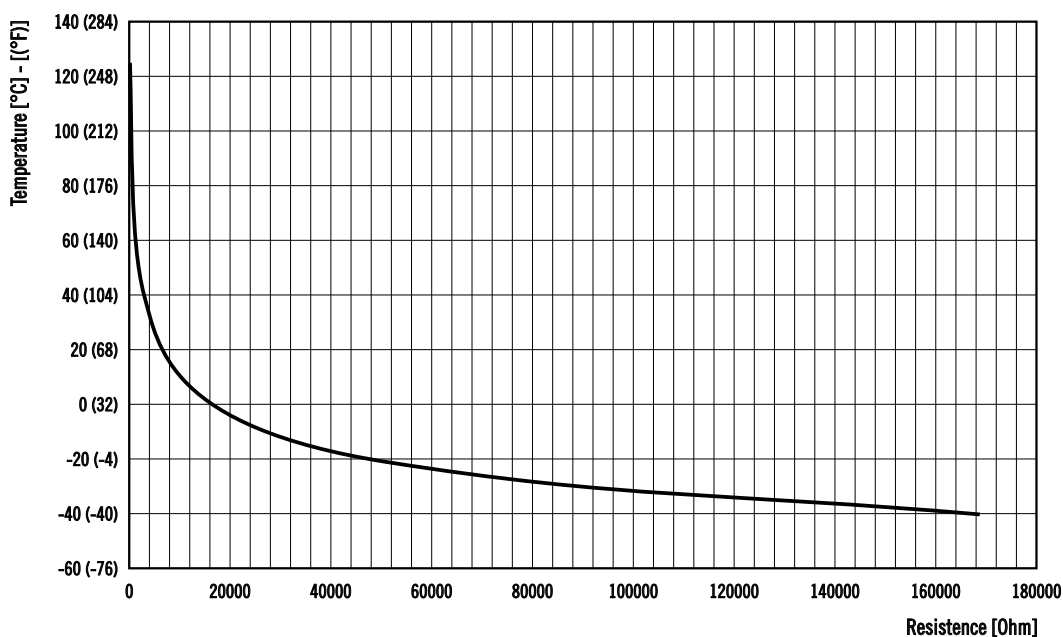


Ordering code

44090250



Curve Resistance/Temperature NTC sensor



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SWIVEL ANGULAR SENSOR MVP SERIES

The swivel angular sensor converts the actual position of the swashplate into a voltage output signal that can be used for different purposes.

Application: Non-contact swashplate position measurement (for example for electronic torque regulation in CS torque control).

Electrical characteristics

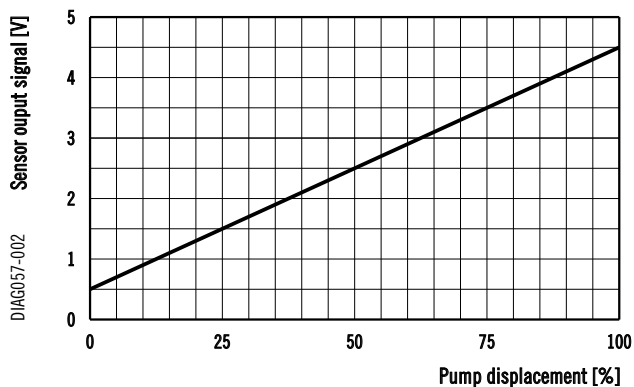
Power supply	8 ÷ 30 V DC
Operating temperature	-40 ÷ 125 °C (-40 ÷ 257 °F)
Cable length	150 mm (5.91 in)
Angular resolution	12 bit
Output signal	0,5 ÷ 4,5 V
Cable	4-core, 0,34 mm ² (0.0005 in ²) unshielded
Current consumption	< 40 mA
Short circuit immunity	Output against ground Output against Vbb
Reverse polarity protection	Power supply lines

EMC protection

Radiated emission	Reference standards: UNI EN 14982 • Frequency range: 30 MHz ÷ 1 GHz
Radiated immunity	Reference standards: ISO11452-2 • Frequency range: 200 MHz ÷ 2 GHz • Test level: 100 V/m
Load dump protection	Reference standards: ISO 7637-2 • Test level: 123 V
Electrostatic discharge	Reference standards: ISO 10605 • ±4, ±6, ±8 kV (Contact discharge) • ±4, ±6, ±8, ±15 kV (Indirect discharge) • ±4, ±6, ±8, ±15 kV (Air discharge)

Output signal

Output signal is proportional to swashplate angular position



Environmental resistance

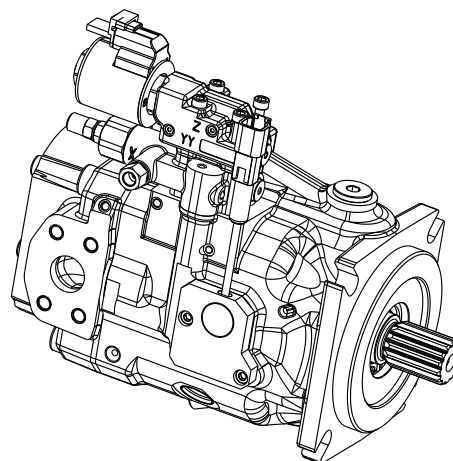
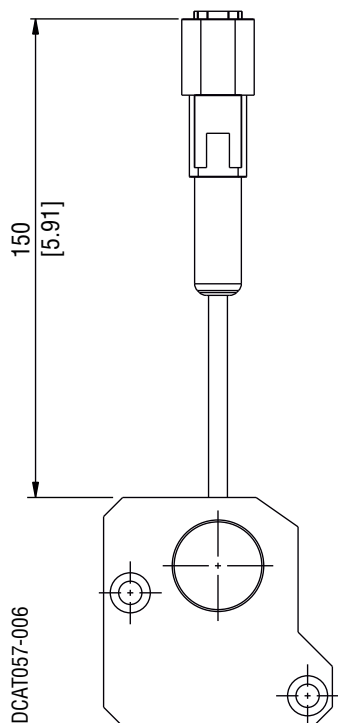
Random noise	Reference standards: EN 60068-2-64 • ASD= 0,1 g ² (RMS 3,3 g) • f= 10 ÷ 1000 Hz • Duration per axis (xyz): 8 h
Mechanical shock	Reference standards: EN 60068-2-29 • Type of shock: Half sine • Acceleration amplitude: = 40 g • Shock duration: 6 ms • 100 positive shocks for each axis • 100 negative shocks for each axis
IP67 protection	Reference standards: EN 60529
IP6K9K protection	Reference standards: ISO 20653
Temperature cycle test	Reference standards: ISO 16750-4 • Temperature: -40 ÷ 125 °C (-40 ÷ 257 °F) • Number of cycles: 30
Temperature shock test	Reference standards: ISO 16750-4 • 60 min @ -40 °C • 20 min @ 125 °C • Number of cycles: 20
Low temperature test	Reference standards: ISO 16750-4 • Temperature: -40 °C (-40 °F) • Test duration: 24 h
High temperature test	Reference standards: ISO 16750-4 • Temperature: 125 °C (257 °F) • Test duration: 48 h

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SWIVEL ANGULAR SENSOR MVP SERIES

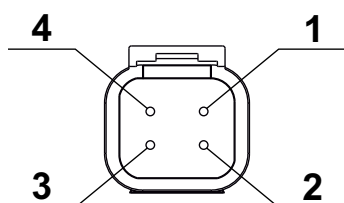
Mounting position

For more information please refer to the technical catalogue.



Connector type

4 pin DTM04-4P – Secondary lock WM-4P



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Pin	Function
1	Power supply / V DC
2	Signal
3	Ground
4	Vprog

Mating Connector: DTM06-4S with secondary lock WM-4S

SWIVEL ANGULAR SENSOR LVP SERIES

The swivel angular sensor converts the actual position of the swashplate into a voltage output signal that can be used for different purposes.

Application: Non-contact swashplate position measurement (for example for electronic torque regulation in CS torque control).

Electrical characteristics

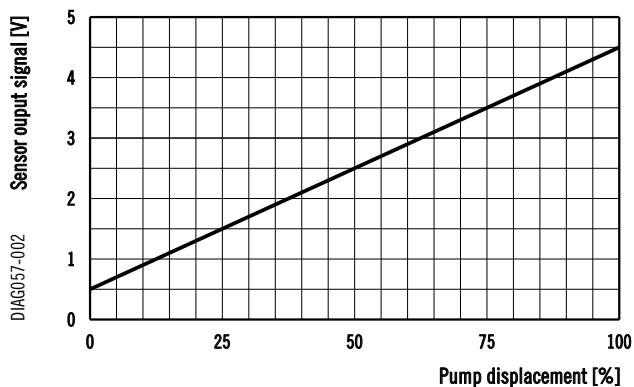
Power supply	8 ÷ 30 V DC
Operating temperature	-40 ÷ 125 °C (-40 ÷ 257 °F)
Cable lenght	280mm (11.02 in)
Angular resolution	12 bit
Output signal	0,5 ÷ 4,5 V
Cable	4-core, 0,34 mm ² (0.0005 in ²) unshielded
Current consumption	< 40 mA
Short circuit immunity	Output against ground Output against Vbb
Reverse polarity protection	Power supply lines

EMC protection

Radiated emission	Reference standards: UNI EN 14982 • Frequency range: 30 MHz ÷ 1 GHz
Radiated immunity	Reference standards: ISO11452-2 • Frequency range: 200 MHz ÷ 2 GHz • Test level: 100 V/m
Load dump protection	Reference standards: ISO 7637-2 • Test level: 123 V
Electrostatic discharge	Reference standards: ISO 10605 • ±4, ±6, ±8 kV (Contact discharge) • ±4, ±6, ±8, ±15 kV (Indirect discharge) • ±4, ±6, ±8, ±15 kV (Air discharge)

Output signal

Output signal is proportional to swashplate angular position



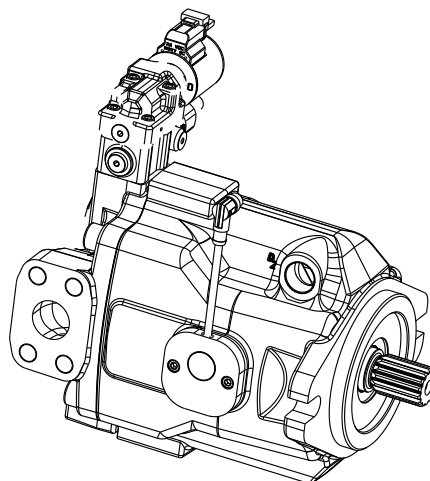
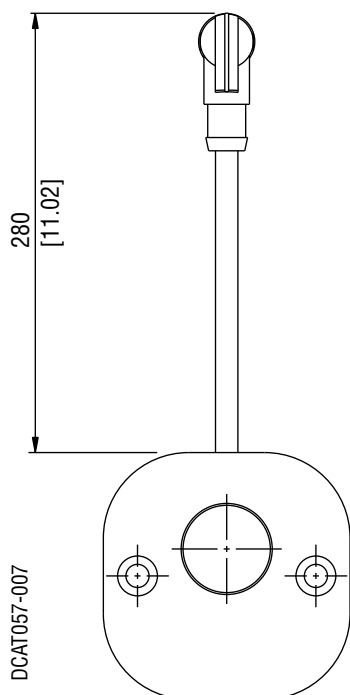
Environmental resistance

Random noise	Reference standards: EN 60068-2-64 • ASD= 0,1 g ² (RMS 3,3 g) • f= 10 ÷ 1000 Hz • Duration per axis (xyz): 8 h
Mechanical shock	Reference standards: EN 60068-2-29 • Type of shock: Half sine • Acceleration amplitude: = 40 g • Shock duration: 6 ms • 100 positive shocks for each axis • 100 negative shocks for each axis
IP67 protection	Reference standards: EN 60529
IP6K9K protection	Reference standards: ISO 20653
Temperature cycle test	Reference standards: ISO 16750-4 • Temperature: -40 ÷ 125 °C (-40 ÷ 257 °F) • Number of cycles: 30
Temperature shock test	Reference standards: ISO 16750-4 • 60 min @ -40 °C (-40 °F) • 20 min @ 125 °C (257 °F) • Number of cycles: 20
Low temperature test	Reference standards: ISO 16750-4 • Temperature: -40 °C (-40 °F) • Test duration: 24 h
High temperature test	Reference standards: ISO 16750-4 • Temperature: 125 °C (257 °F) • Test duration: 48 h

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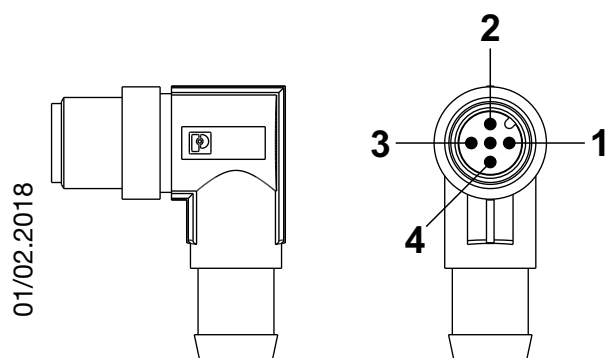
SWIVEL ANGULAR SENSOR LVP SERIES

Mounting position



Connector type

5 pin M12x1 male plug 90° angled



Pin	Function
1	V _{prog}
2	Power supply / V DC
3	Ground
4	Signal

Mating Connector: 5 pin M12x1 female connector

CONNECTORS KIT

Female connector DTM06-12SA

Kit include female connector, female contacts and seals



Ordering code

44090140

Technical data

Operating temperature	-40 ÷ 125 °C (-40 ÷ 257 °F)
Number of ways	12
Protection	IP68

Female connector DTM06-12SB

Kit include female connector, female contacts and seals



Ordering code

44090145

Technical data

Operating temperature	-40 ÷ 125 °C (-40 ÷ 257 °F)
Number of ways	12
Protection	IP68

Female connector JR Power Timer

Kit include female connector, female contacts and seals



Ordering code

44090163

Technical data

Operating temperature	-30 ÷ 125 °C (-22 ÷ 257 °F)
Number of ways	2
Wire size	18 - 22 AWG
Current rating	20 A
Voltage, max	250 V DC
Protection	IP65

Female connector DIN type



Ordering code

05101206

Technical data

Operating temperature	-40 ÷ 90 °C (-40 ÷ 194 °F)
Number of ways	3
Wire size	18 - 22 AWG
Current rating	16 A
Voltage, max	250 V AC / 300 V DC
Protection	IP65
Thread size	PG11

Female connector DT06-2S

Kit include female connector, female contacts and seals



Ordering code

RCON0016

Technical data

Operating temperature	-55 ÷ 125 °C (-67 ÷ 257 °F)
Number of ways	2
Wire size	14 - 22 AWG
Current rating	13 A
Voltage, max	250 V DC
Protection	IP67

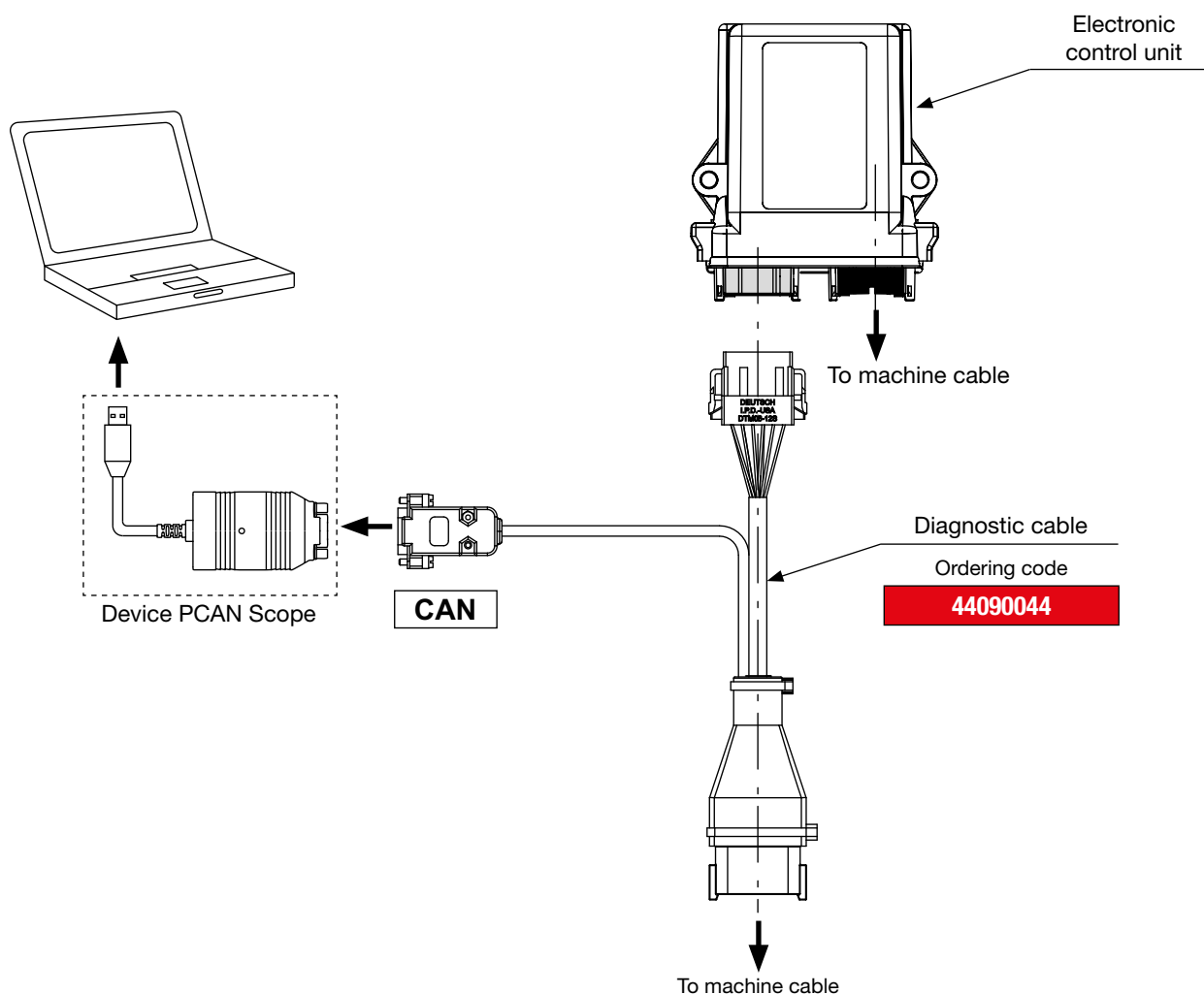
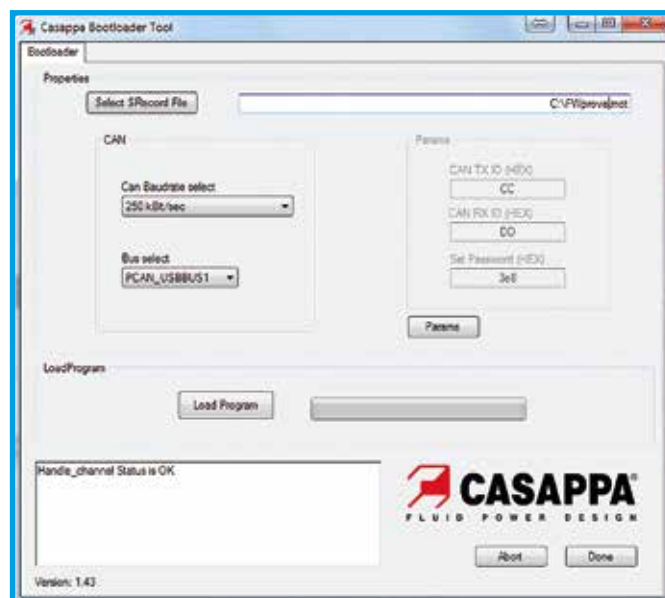
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CASAPPA BOOTLOADER TOOL AND DIAGNOSTIC CABLE

The software allows remote electronic control unit programming through CAN interface (device PCAN scope).

KEY FEATURES

- Direct file selection and loading
- CAN Baudrate selection
- One-Click reprogramming procedure



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CASAPPA SERVICE TOOL SOFTWARE

KEY FEATURES

- Parametrization of ECS200 / ECS300 control units
- Monitor and diagnostic functions
- Auto detection of the different type of control unit



HOME PAGE

Connection through Bluetooth or CAN BUS interface.



CONTROL INTERFACE

Read and change software parameter.
Check in case of incorrect values added.

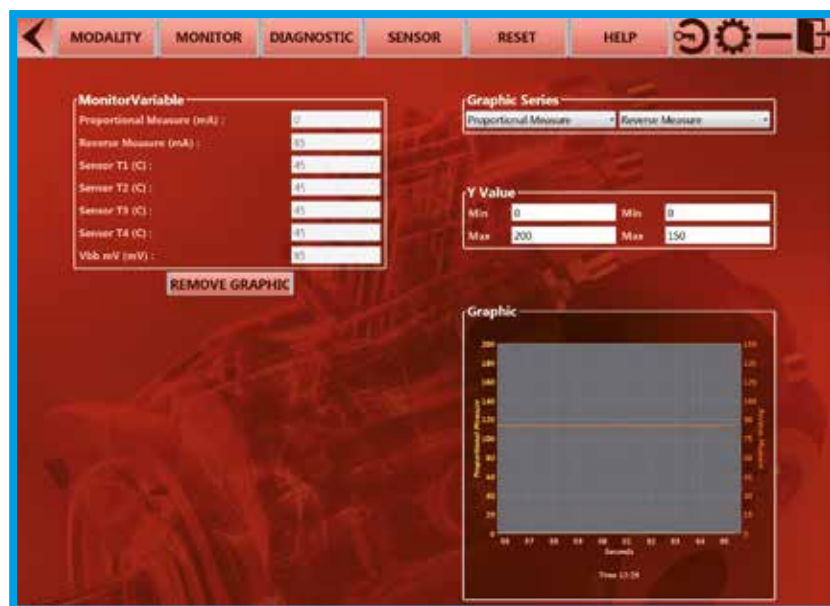
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CASAPPA SERVICE TOOL SOFTWARE



DIAGNOSTIC INTERFACE

Real-time monitoring of control unit error messages.



MONITOR INTERFACE

Graphical view of the measured variables over time.



CONFIGURATION INTERFACE

Save/store control unit parameters configuration to/from file.

Reset control unit parameters configuration to factory defaults.

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NOTES

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EL 01 T A

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