

## Electrical level indicators

with MIN level electrical sensor, temperature sensor and probe, transparent technopolymer

### MATERIAL

Transparent polyamide based (PA-T) technopolymer. Highly resistant to shocks, solvents, oils with additives, aliphatic and aromatic hydrocarbons, petrol, naphtha, phosphoric esters. Avoid contact with alcohol or detergents containing alcohol.

### SCREWS, NUTS AND WASHERS

Zinc-plated steel.

### PACKING RINGS

Step-shaped for the seal on the reservoir walls and NBR synthetic rubber O-ring screw underhead. Suggested roughness of the packing ring application surface  $R_a = 3 \mu\text{m}$ .

### FLOAT

Glass-fibre reinforced polyamide based (PA) technopolymer, black colour, with a built-in magnetic element to activate the electric contact when the float reaches the contact threshold indicated in the drawing (data referred to mineral oil type CB68, according to ISO 3498, temperature 23°C). Floating is ensured by fluids with densities higher than 800 kg/m<sup>3</sup>.

### BRACKET WITH MALE CONNECTOR

Perfectly watertight, incorporating the relay (reed) with two output conductors (NO and NC version) and/or with MAX temperature sensor (80°C) and/or temperature probe.

- DIN 43650 C connector in glass-fibre reinforced polyamide based (PA) technopolymer, black colour.
- 4-pole M12x1 connector, with threading in glass-fibre reinforced polyamide based (PA) technopolymer certified self-extinguishing UL-94-V0, black colour, matte finish.

For a correct assembly see Warnings (on page -).

### FEMALE CONNECTOR (DIN 43650 C)

With built-in cable gland and contact holder. Front or axial output (high or low) ensuring protection against water sprays (protection class IP 65 according to table EN 60529 on page -).

### CONTRAST SCREEN

White lacquered aluminium. The housing, in the appropriate external rear slot, guarantees the best protection from direct contact with fluid. It can be taken out from the inclined side, before assembly to allow the insertion of level lines or words.

### STANDARD EXECUTIONS

See configuration table.

### MAXIMUM CONTINUOUS WORKING TEMPERATURE

90°C (with oil).

### TECHNICAL DATA

In laboratory tests carried out with mineral oil type CB68 (according to ISO 3498) at 23°C for a limited period of time, the weld stood up to: 18 bar (HCV.76), 18 bar (HCV.127) and 12 bar (HCV.254). For use with fluids other than mineral oils and under particular different pressure and temperature conditions, please contact ELESA Technical Department. In any case we suggest to verify the suitability of the product under the actual working conditions.



ELESA Original design

### SPECIAL EXECUTIONS ON REQUEST

- Level indicators with stainless steel screws, nuts and washers.
- Level indicators HCV.76 with screws M12.
- Level indicators for use with fluids containing alcohol.
- UV resistant transparent technopolymer level indicators.
- MAX temperature electrical sensor with trigger threshold at 70°C or 90°C.

### ACCESSORIES ON REQUEST

FC-M12x1: extensions with 4 pole M12 female axial connector.

### FEATURES AND PERFORMANCES

The HCV-E-S level indicators, in addition to the visual level indicator, also provide an electrical signal when the minimum fluid level value is reached. The HCV-E-ST indicators also provide an electrical signal when the maximum preset temperature value (80°C) is reached. The HCV-E-STL indicators provide an analogue electrical signal of the oil temperature. The lateral connector output allows the level of intervention of the sensor to be minimised. Ultrasound welding to guarantee a perfect seal. Maximum fluid level visibility even from side positions. Lens effect for a better visibility of the fluid level. In case of use of an extension with angled connector, the direction of the cable output is shown in Fig.1.

Fig.1  
HCV-E-ST-KN  
HCV-E-STL-KN

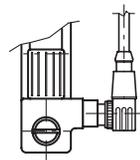
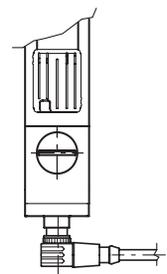


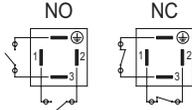
Fig.1  
HCV-E-ST-AX-KN  
HCV-E-STL-AX-KN



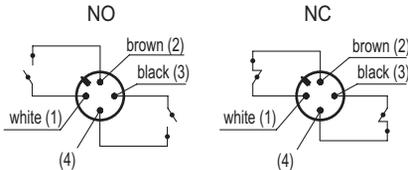
### FUNCTIONING OF THE SENSORS

- NO: electrical contact closes when the minimum and/or preset temperature of 80°C is reached.
- NC: electrical contact opens when the minimum and/or preset temperature of 80°C is reached.

#### HCV-E-ST - HCV-E-ST-AX

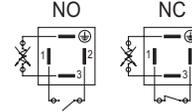


#### HCV-E-ST-KN - HCV-E-ST-AX-KN

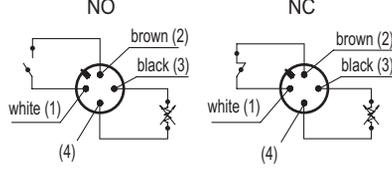


\*The colours refer to the use of the FC M12x1 extension  
 \*\* contact 1-2 electric level sensors  
 contact 3-4 MAX temperature electrical sensor

#### HCV-E-STL - HCV-E-STL-AX



#### HCV-E-STL-KN - HCV-E-STL-AX-KN



\*The colours refer to the use of the FC M12x1 extension  
 \*\* contact 1-2 electric level sensors  
 contact 3-4 MAX temperature electrical sensor

HCV-E-ST - HCV-E-ST-KN - HCV-E-ST-AX - HCV-E-ST-AX-KN		
Electrical features	MIN level sensor	
Power supply	AC/DC	
Electric contacts	NO normally open NC normally closed	
Maximum applicable voltage	NO: 140 Vac, 200 Vdc	DIN 43650 C
	NC: 140 Vac, 150 Vdc	
	30 Vac, 30 Vdc	KN
Voltage range (Type KN)	<30 Vac, <30 Vdc	
Maximum switching current	1 A	
Maximum current	NO: 1.2A NC: 2A	
Maximum commutable power	NO: 10 Va NC: 20 Va	
Cable gland (only HCV-E-ST - HCV-E-ST-AX)	Pg 7 (for cables in sheath with Ø 6 or 7 mm)	
Conductors cross-section (only HCV-E-ST - HCV-E-ST-AX)	Max. 1.5 mm <sup>2</sup>	
Connector (only HCV-E-ST-KN - HCV-E-STL-AX-KN)	M12x1	
Do not mount this indicator in proximity to magnetic fields.		

HCV-E-STL - HCV-E-STL-KN - HCV-E-STL-AX - HCV-E-STL-AX-KN		
Electrical features	MIN level sensor	
Power supply	AC/DC	
Electric contacts	NO normally open NC normally closed	
Maximum applicable voltage	NO: 140 Vac, 200 Vdc	DIN 43650 C
	NC: 140 Vac, 150 Vdc	
	30 Vac, 30 Vdc	KN
Voltage range (Type KN)	<30 Vac, <30 Vdc	
Maximum switching current	1 A	
Maximum current	NO: 1.2A NC: 2A	
Maximum commutable power	NO: 10 Va NC: 20 Va	
Cable gland (only HCV-E-STL - HCV-E-STL-AX)	Pg 7 (for cables in sheath with Ø 6 or 7 mm)	
Conductors cross-section (only HCV-E-STL - HCV-E-STL-AX)	Max. 1.5 mm <sup>2</sup>	
Connector (only HCV-E-STL-KN - HCV-E-STL-AX-KN)	M12x1	
Do not mount this indicator in proximity to magnetic fields.		

HCV-E-ST - HCV-E-ST-KN - HCV-E-ST-AX - HCV-E-ST-AX-KN		
Electrical features	MAX temperature sensor	
Power supply	AC/DC	
Electric contacts	NO normally open NC normally closed	
Voltage / Maximum current	250 Vac - 2 A	(resistive loads)
	115 Vac - 3A	
	24 Vdc - 3 A	DIN
	12 Vdc - 4 A	43650 C
30 Vac, 30 Vdc	KN	
Voltage range (Type KN)	<30 Vac, <30 Vdc	
Minimum current	500 mA	
Cable gland (only HCV-E-ST - HCV-E-ST-AX)	Pg 7 (for cables in sheath with Ø 6 or 7 mm)	
Conductors cross-section (only HCV-E-ST - HCV-E-ST-AX)	Max. 1.5 mm <sup>2</sup>	
Connector (only HCV-E-ST-KN - HCV-E-ST-AX-KN)	M12x1	
Do not mount this indicator in proximity to magnetic fields.		

HCV-E-STL - HCV-E-STL-KN - HCV-E-STL-AX - HCV-E-STL-AX-KN	
Electrical features	Temperature probe
Power supply	AC/DC
Maximum current	1mA
Cable gland (only HCV-E-STL - HCV-E-STL-AX)	Pg 7 (for cables in sheath with Ø 6 or 7 mm)
Conductors cross-section (only HCV-E-STL - HCV-E-STL-AX)	Max. 1.5 mm <sup>2</sup>
Connector (only HCV-E-STL-KN - HCV-E-STL-AX-KN)	M12x1
Do not mount this indicator in proximity to magnetic fields.	



### FUNCTIONING OF THE TEMPERATURE ELECTRICAL PROBE (STL)

The working principle of the temperature probe is to measure the variation of resistance of a platinum element: 100 ohm = 0°C, 138.4 ohm = 100°C.

The function between temperature (T) and resistance (R) is approximately linear over a small temperature range: for example, if you assume that it is linear over the 0° to 100°C range, the error at 50°C is 0.4°C.

For precision measurement, it is necessary to linearise the resistance to give an accurate temperature. The most recent definition of the function between resistance and temperature is International Temperature Standard 90 (ITS-90). The function between resistance and temperature, obtained in laboratory tests, measuring directly the resistance value on the contacts is shown in the graph. We suggest, anyway, to set the system in order to compensate both heat dissipation and cable resistance.

The temperature variation of 1°C causes a 0.384 ohm variation in the probe resistance. Therefore, even a small error in the resistance measurement (for example, if the resistance of the cables connecting to the probe were not considered) translates into a significant error in the temperature measurement.

Because of the low signal levels, it is important to keep any cables away from electric cables, motors, switchgear and other devices that may emit magnetic or electrical noise. Using screened cable, with the screen grounded at one end, may help to reduce interference. Furthermore, if long connection cables are used, make sure that the signal measurement and reception device is designed to compensate for the resistance of the cables themselves.

Resistance / temperature conversion graph

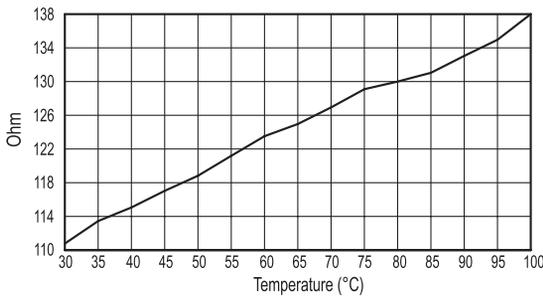
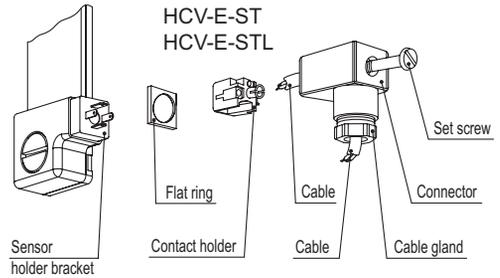


TABLE FOR STANDARD EXECUTIONS SET-UP

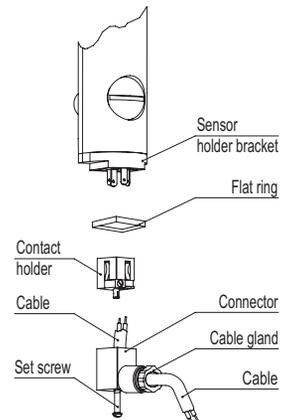
HCV.		127	E	ST	AX	NO	M12	KN
		①		②	③	④	⑤	⑥
① Centre distance (f)	76	76 mm						
	127	127 mm						
	254	254 mm						
② Temperature Sensor / Probe	ST	MAX temperature electrical sensor						
	STL	PT 100 temperature electrical probe						
③ Sensor position		Side						
	AX	Axial (for execution 127 of paragraph 1 and executions NO-80 and NC-80 of paragraph 4).						
④ Electrical contact	NO	Normally open electrical contact that closes when the MIN level is reached (for STL execution in paragraph 2).						
	NC	Normally closed electrical contact that opens when the MIN level is reached (for STL execution in paragraph 2).						
	NO-60	Normally open electrical contact that closes when the MIN level and/or preset 60°C temperature is reached.						
	NC-60	Normally closed electrical contact that opens when the MIN level and/or preset 60°C temperature is reached.						
	NO-70	Normally open electrical contact that closes when the MIN level and/or preset 70°C temperature is reached.						
	NC-70	Normally closed electrical contact that opens when the MIN level and/or preset 70°C temperature is reached.						
⑤ Screw threading	M10	M10 (for execution 76 in paragraph 1).						
	M12	M12						
⑥ Connector		DIN 43650 C, adjustable front or side output.						
	KN	4-pole male M12x1						

### FEMALE CONNECTOR ASSEMBLY INSTRUCTIONS

- Remove the connector from the indicator by unscrewing the set screw placed on the connector, take the contact holders out and loosen the cable gland.
- a) HCV-E-ST: insert the cable into the connector (standard connector) and connect the wires to terminals 1 and 2 for the operation of the MIN level sensor, to terminals 3 and ground (4) for the operation of the MAX temperature sensor.
- b) HCV-E-STL: insert the cable into the connector (standard connector) and connect the wires to terminals 1 and 2 for the operation of the MIN level sensor, to terminals 3 and ground (4) for the operation of the temperature probe.
- Assemble by pressing the contact holder into the connector in the required position.
- Screw the connectors to the indicator and then tighten the cable glands.



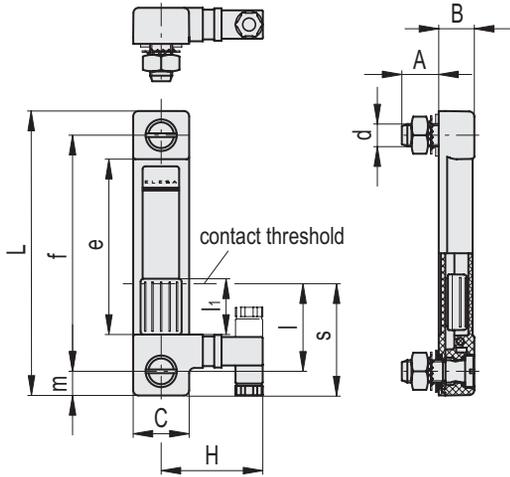
### HCV-E-ST-AX HCV-E-STL-AX



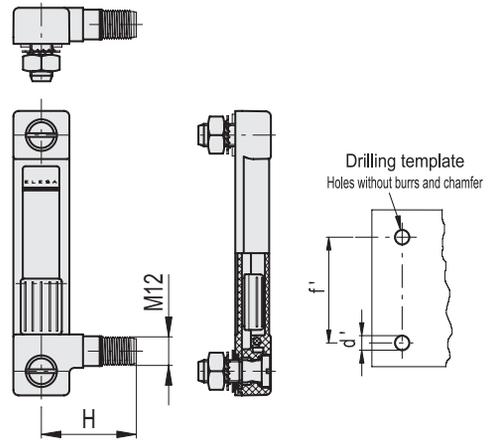
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Accessories for hydraulic systems 15

HCV-E-ST  
HCV-E-STL



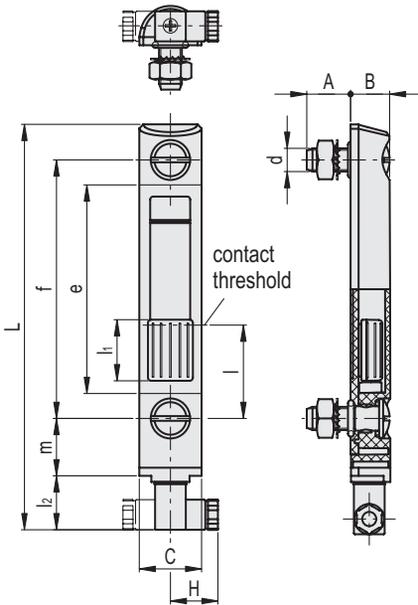
HCV-E-ST-KN  
HCV-E-STL-KN



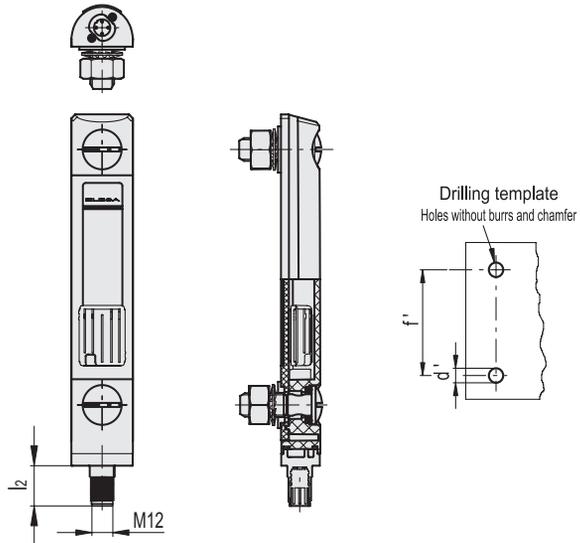
HCV-E-ST - HCV-E-STL															
f	d	A	B	C	H	L	e	l	i	m	s	d'-0.2	f±0.2	C# [Nm]	Δ
76	M10	20	19.5	30.5	55	102	43.5	40	20	13	53	10.5	76	12	133
127	M12	20	19.5	30.5	55	153	97	50	30	13	63	12.5	127	12	153
254	M12	20	19.5	30.5	55	280	224	50	30	13	63	12.5	254	12	180

HCV-E-ST-KN - HCV-E-STL-KN															
f	d	A	B	C	H	L	e	l	i	m	s	d'-0.2	f±0.2	C# [Nm]	Δ
76	M10	20	19.5	30.5	47	102	43.5	40	20	13	53	10.5	76	12	133
127	M12	20	19.5	30.5	47	153	97	50	30	13	63	12.5	127	12	153
254	M12	20	19.5	30.5	47	280	224	50	30	13	63	12.5	254	12	180

HCV-E-ST-AX  
HCV-E-STL-AX



HCV-E-ST-AX-KN  
HCV-E-STL-AX-KN



HCV-E-ST-AX - HCV-E-STL-AX															
f	d	A	B	C	H	L	e	l	i	l2	m	d'-0.2	f±0.2	C# [Nm]	Δ
127	M12	21.8	20	31	25.5	201.5	97	50	30	29	28	12.5	127	12	223

HCV-E-ST-AX-KN - HCV-E-STL-AX-KN															
f	d	A	B	C	L	e	l	l1	l2	m	d'-0.2	f±0.2	C# [Nm]	Δ	
127	M12	21.8	20	31	194.5	97	50	30	20	30	30	12.5	127	12	223

# Maximum tightening torque.

