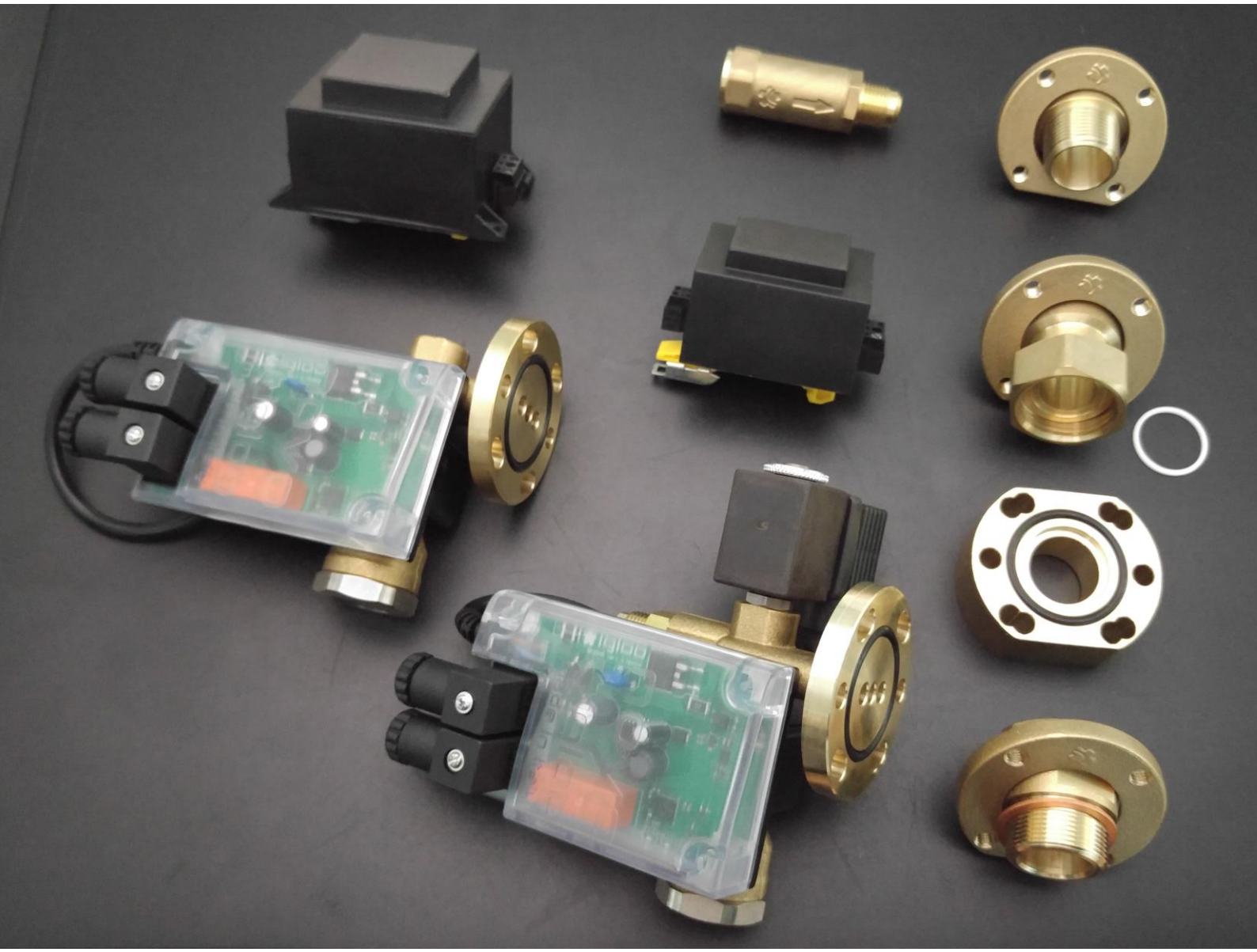
Magneto-electronic oil level regulator

with microprocessor and internal memory

Refrigerant level sensor

with integrated relay and sight glass



Oil and Refrigerant level management devices

The **IGLOO NOVO** magneto-electronic level regulator detects and controls the oil level in all types of commercial refrigeration compressors. The compact design make it perfect for use with all reciprocating and scroll refrigeration compressors, but thanks to the **microprocessor-based electronics** can be setted-up to be used with all the type of compressors.

It can be **programmed** to optimize oil feeding cycles, alarm delay, temperature and voltage limits and it records in an **internal memory** useful information about running time, solenoid operations, filling cycles, alarms, working temperature and supply voltage.

It is characterized by a reliable level regulation thanks to a **Hall-sensor** that avoids all the problems typical of optical sensors - such as foam reading, external light or oil impurity interference. The **integrated solenoid** valve feeds missing oil directly into the compressor sump.

The IGLOO NOVO unit has been designed to allow **easily remove** and replace of the **electronic block** without need to depressurize or remove the oil from the compressor. The sight glass function remains fully available, while level information is indicated by mean of 3 LEDs. The integrated alarm function with compressor shut down guarantees a reliable **protection** of the system.

Features

- The patented **magneto-electronic** innovative design is used for oil level regulators and for refrigerant level sensors
- **Replaceable electronics** without need to depressurize or remove the oil from the compressor
- Oil level magnetic sensor and solenoid valve are **protected by 3 filter strainers**
- **Programmable** oil feeding cycles, sensitivity, alarm delays, (eventual) limit temperature and voltage alarms
- **Live data recording** of running time, solenoid operations, filling cycles, alarms, working temperature, supply voltage

- **Easy installation** by sight-glass replacement: direct mounting onto 3/4 bolts compressors and adapter kits available for various type of compressors
- A **tilt sensor** integrated into the electronic block allows **left/right installation** of the regulator with automatic recognition of orientation, in order to orientate the LEDs and the sight glass to the preferred direction without need to disassembly the regulator
- Broad range of **temperature**
  - Environment temperature from -40°C to +60°C
  - Fluid temperature from -30°C to +90°C
- SPDT **relay output** contact for compressor shut down or alarming
  - Rating 230VAC / 5A
  - 1NO + 1NC output
- **IP65**: protection rated 6 to dust and 5 to water
- **CE** marking under Low Voltage and Electromagnetic Compatibility Directives

Operating logic

The **IGLOO NOVO** regulator controls the oil level between 45% and 55% of the sight glass by using 2 elements: a Hall-sensor and a patented permanent magnet designed to float onto the oil surface.
The magnetic field measured by the hall-sensor depends on the distance of the 2 elements and the magnetic signal is elaborated in real-time by a microprocessor to derive the exact oil level, with no possibility of errors due to foaming, external light interference or impurities into the oil.
Depending on the oil level, the microprocessor opens or closes an integrated solenoid valve which feeds missing oil directly into the compressor crankcase.
If the single oil feeding cycle exceeds the duration limit set to 90 seconds, the IGLOO NOVO generates an alarm signal and the alarm contacts (SPDT) change into alarm status. During the alarm status the oil continues to be filled into the compressor, and once the optimal oil level is restored the Alarm is immediately resetted.
Eventually the **IGLOO NOVO** can be programmed to set different oil feeding cycles, change the alarm delay, the temperature and the voltage alarms. During operation the live data recording is always active and it stores useful information about running time, solenoid operations, filling cycles, alarms, working temperature and supply voltage that can be used for troubleshooting or for optimization of the oil feeding cycles.

Controller operation with standard settings: *(delays are customizable)*

Oil level	Sight glass	LEDs Status	Delay *(standard settings)*	Solenoid function	Alarm relay *(SPDT: 1 NC + 1 NO)*
OK	**45% ÷ 55%**	Green	-	-	-
LOW	**< 45%**	Green - Orange	10 sec	Oil feed	-
EMPTY	**<< 45%**	Red - Orange	Alarm: 90 sec Oil feed: 0 sec	Oil feed	Activated

Oil level restore after filling cycle:

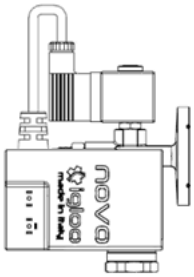
LOW → OK	**> 55%**	Green	0 sec	-	-
EMPTY → OK	**> 55%**	Green	0 sec	-	Deactivated

Supply

IGLOO NOVO units are complete of all the necessary cable connectors, o-rings and mounting bolts and are singly packed into carton boxes, with annex fitting instructions.
IGLOO NOVO-TR1/-TR3 are needed to supply 24V units with 230V AC 50Hz voltage and are singly packed into carton boxes, with annex fitting instructions and CE certificate of conformity.
IGLOO NOVO-RV35 differential oil check valves are useful to guarantee the necessary oil flow rate from the oil reservoir/receiver back to the compressor sump and are singly packed into carton boxes, with annex fitting instructions.
IGLOO ADP- series of adapter kits are available for various type of compressors and are supplied singly packed into carton boxes, with annex fitting instructions and CE certificate of conformity. Other adapter kits are available upon request.

Ordering

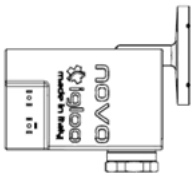
NOVO-OR Oil level regulators, with solenoid valve:



NOVO-OR1A	HFC, HCFC	Medium Temp. -30 ÷ +90 °C Ambient Temp. -40 ÷ +60 °C	PS 46 bar PT 51 bar MOPD 30 bar	230V AC, 50 Hz 6VA
NOVO-OR1B				24V AC, 50 Hz 6VA
NOVO-OR2A	CO_2, HFC		PS 60 bar PT 66 bar MOPD 34 bar	230V AC, 50 Hz 6VA
NOVO-OR2B				24V AC, 50 Hz 6VA

PS = Max. working pressure PT = Max. test pressure
MOPD = Solenoid valve max. operating pressure differential

NOVO-OS Oil level detector, without solenoid valve:



NOVO-OS1A	HFC, HCFC, CO_2	Medium Temp. -30 ÷ +90 °C Ambient Temp. -40 ÷ +60 °C	PS 60 bar PT 85 bar	230V AC, 50 Hz 1VA
NOVO-OS1B				24V AC, 50 Hz 1VA

PS = Max. working pressure PT = Max. test pressure

NOVO-RS Refrigerant level sensors, with integrated relay and sight glass:

NOVO-RS1A	HFC, HCFC, CO_2	Medium Temp. -30 ÷ +90 °C Ambient Temp. -40 ÷ +60 °C	PS 60 bar PT 85 bar	230V AC, 50 Hz 1VA
NOVO-RS1B				24V AC, 50 Hz 1VA

PS = Max. working pressure PT = Max. test pressure

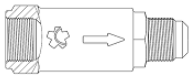
Accessories

NOVO-TR Voltage transformers:

NOVO-TR1	for 1 unit regulator or up to 7 units detector	Input (1): 230V AC, 50 Hz	Output (2): 24V AC, 50 Hz	Max. power rating: 8VA
NOVO-TR3	for 3 units regulator or up to 18 units detector			Max. power rating: 20VA

Higher power ratings are available upon request.

NOVO-RV35 differential oil check valve:



NOVO-RV35	HFC, HCFC, CO_2	-40 ÷ +105 °C PS 60 bar PT 85 bar	Diff. pressure: 3,5 bar	Inlet: SAE f-3/8” Outlet: SAE m-3/8”

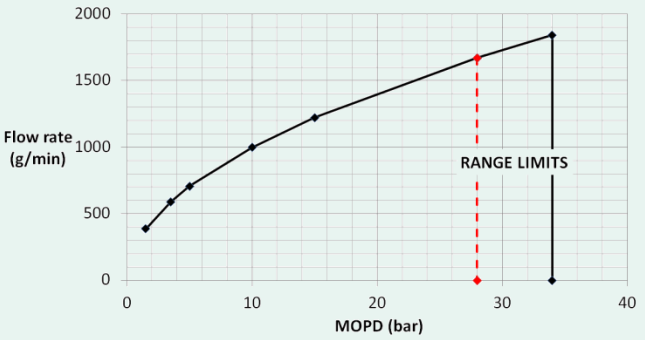
PS = Max. working pressure PT = Max. test pressure

Effect of voltage supply on maximum operating pressure differential (MOPD)

To avoid MOPD reduction *it is recommended to stabilize the voltage supply. For example, generally is recommendable to use IGLOO NOVO oil level regulator 24 V AC supplied by a 230-to-24 V AC transformer instead of IGLOO NOVO oil level regulator 230 V AC. This solution beside being stronger may be also cheaper, because in rack systems 1 transformer can supply up to 3 IGLOO NOVO regulators.*

Supply Voltage -10% – – – – – – –

Supply Voltage -0% ———



Flow rate with differential pressure 3,5 bar: 590 g/min.
Oil: Reniso SP46 at +20 °C

Oil level regulator

Approvals CE (PED, RoHS, REACH, LV, EMC), EAC. Patented design.

Technical data

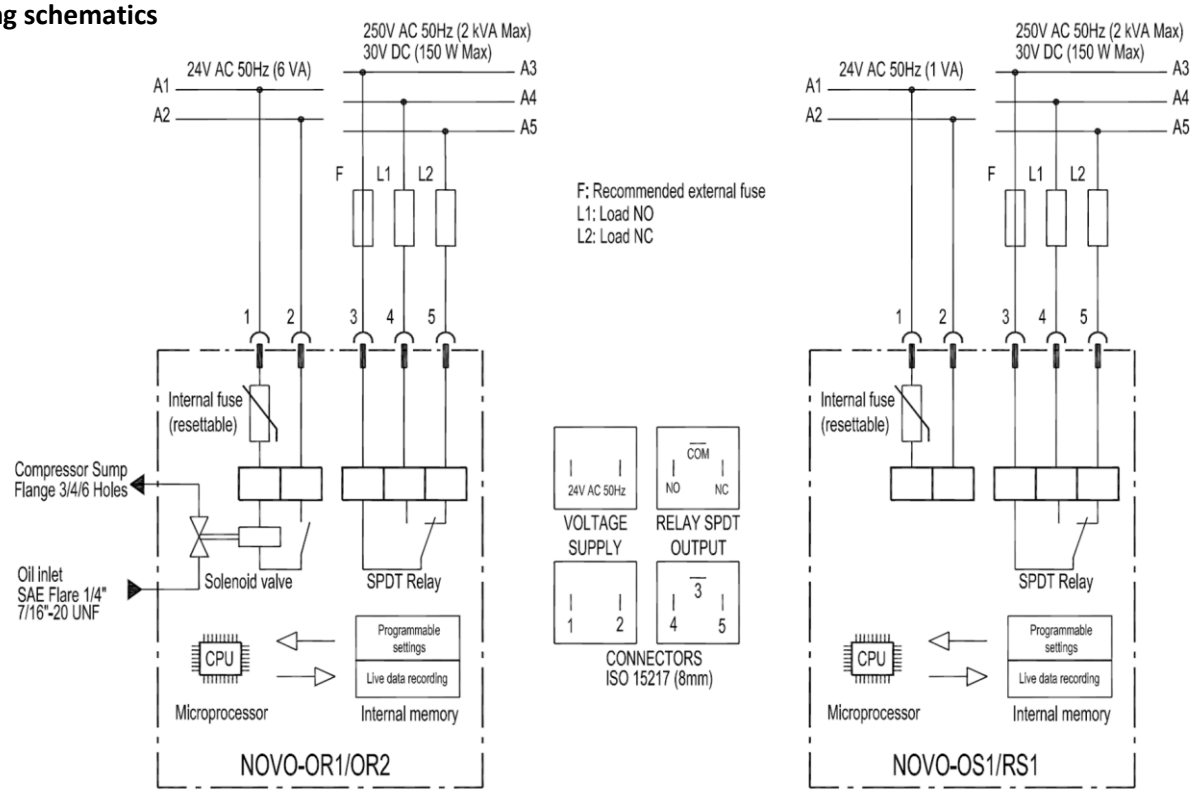
	NOVO-OR1A (46 bar - 230V)	**NOVO-OR1B** (46 bar - 24V)	**NOVO-OR2A** (60 bar - 230V)*	**NOVO-OR2B** (60 bar - 24V)*
	Oil level regulator with integrated solenoid valve			
Supply power and voltage	230 V AC 50 Hz ±10% VA	24 V AC 50 Hz ±10% 6VA	230 V AC 50 Hz ±10% VA	24 V AC 50 Hz ±10% 6VA
Ambient temperature	-40 ÷ +60 °C			
Medium temperature	-30 ÷ +90 °C			
Max. working pressure, PS	46 bar		60 bar	
Max. test pressure, PT	51 bar		66 bar	
Max. differential pressure, MOPD	30 bar		34 bar	
Relay output type	SPDT dry contacts: 1 contact NO + 1 contact NC			
Relay Max. switching voltage	AC load: 250V 50Hz / DC load: 30V			
Relay Max. switching current	AC load: 8A / DC load: 5A			
Relay Max. power rating	AC load: 2.000 VA / DC load: 150 W			
Solenoid valve service life	1 Million of oil feeding cycles			
Cable type	Cable ext. diameter range: 5 ÷ 7mm, Conductors recommended diameter 0,75mm^2 Relay connector: 3 conductors, Voltage supply connector: 2 conductors			
Protection class (with connectors)	IP 65 according to IEC 529, EN 60529			
Materials	Body, inlet fitting and Adapters: Brass EN12164, EN12165 Screws and sight glass: Nickel plated steel EN 10027			
Refrigerant compatibility	HFC, HCFC, CO_2			
Lubricant compatibility	All: mineral, synthetic and ester lubricants			
Orientation of body unit	Horizontal ±1° with automatic position identification Right mount: natural position, Left mount: 180° tilted position (upside down)			
Level control	50% ±5% of the sight glass			
Oil inlet connection	7/16”-20 UNF male, with strainer and o-ring (replaceable)			
Led indication	Green Level OK	Green - Orange Oil feeding cycle	Red - Orange Alarm (and oil feeding)	
Time dealy	Oil feeding: 10 sec, customizable Alarm: 90 sec, customizable			

* NOVO-OR2A and NOVO-OR2B can be incorporated also in compressors designed for CO_2 transcritical, but in conjunction with oil receivers / reservoirs up to maximum 60 bar.

Technical data

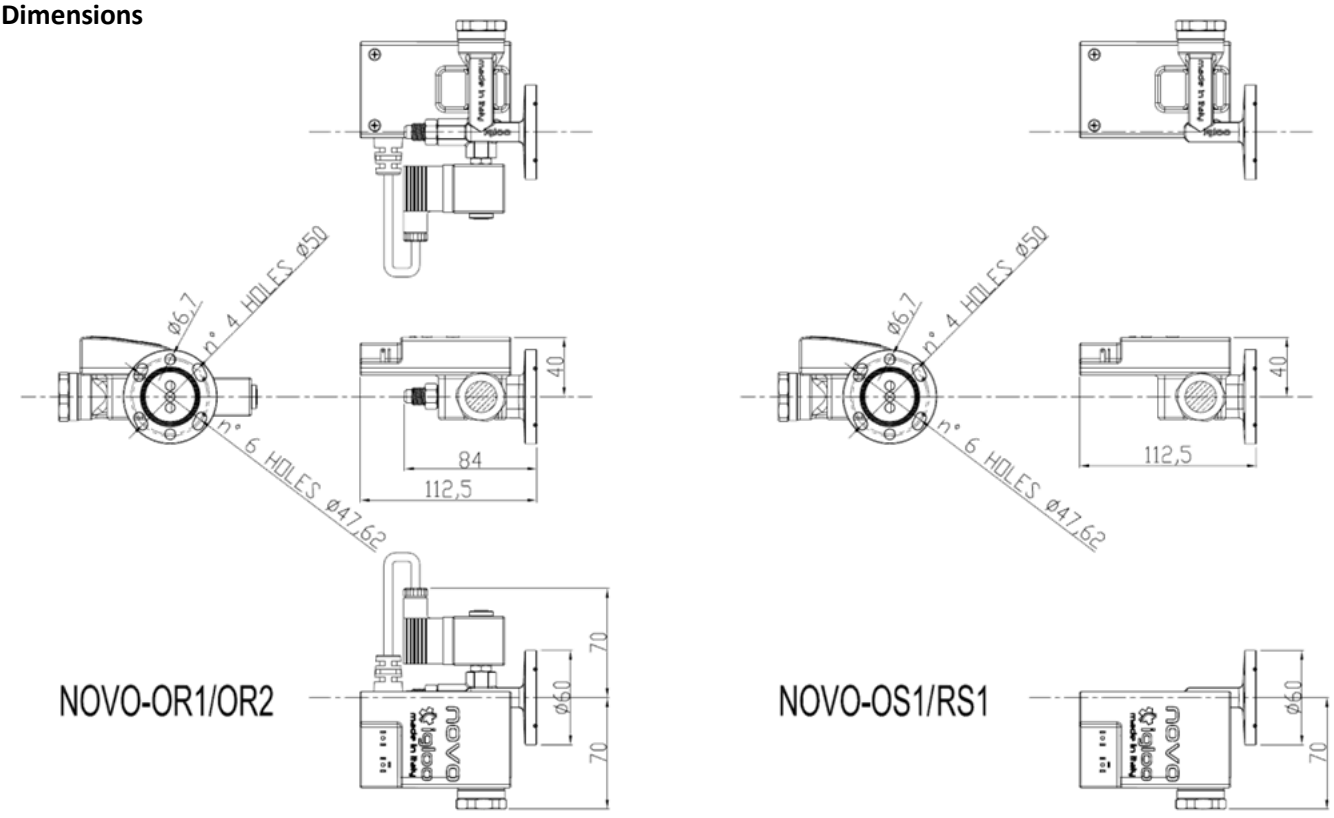
	NOVO-OS1A (230V)	NOVO-OS1B (24V)	NOVO-RS1A (230V)	NOVO-RS1B (24V)
	Oil level detector without solenoid valve		**Refrigerant level sensor** with integrated relay output and sight glass	
Supply power and voltage	230 V AC 50 Hz ±10% 6VA	24 V AC 50 Hz ±10% 6VA	230 V AC 50 Hz ±10% 1VA	24 V AC 50 Hz ±10% 1VA
Ambient temperature	-40 ÷ +60 °C			
Medium temperature	-30 ÷ +90 °C			
Max. working pressure, PS	60 bar			
Max. test pressure, PT	85 bar			
Relay output type	SPDT dry contacts: 1 contact NO + 1 contact NC			
Relay Max. switching voltage	AC load: 250V 50Hz / DC load: 30V			
Relay Max. switching current	AC load: 8A / DC load: 5A			
Relay Max. power rating	AC load: 2.000 VA / DC load: 150 W			
Cable type	Cable ext. diameter range: 5 ÷ 7mm, Conductors recommended diameter 0,75mm^2 Relay connector: 3 conductors, Voltage supply connector: 2 conductors			
Protection class *with connectors*	IP 65 according to IEC 529, EN 60529			
Materials	Body and Adapters: Brass EN12164, EN12165 Screws and sight glass: Nickel plated steel EN 10027			
Refrigerant compatibility	HFC, HCFC, CO_2			
Lubricant compatibility	All: mineral, synthetic and ester lubricants			
Orientation of body unit	Automatic identification of the orientation: - right sight glass (natural position) - left sight glass: (upside-down)		Frontal installation	
Level control	50% ±5% of the sight glass			
Led indication	Green ● Level OK		Red ● Level Low	
Time delay Alarm	90 sec, customizable		0 sec	

Wiring schematics



Remark: *For simplicity the schematics refer to 24V AC devices. Same connection applies also to 230V AC devices.*

Dimensions



Remark: *3D models are available upon request.*

Adapters for oil level regulator

Adapter selection guideline

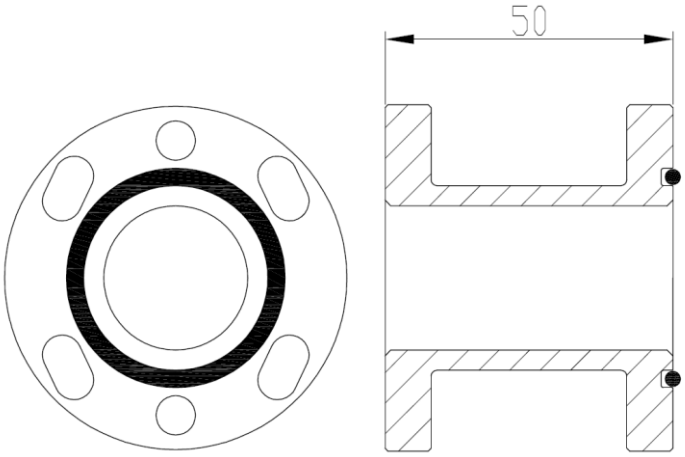
	Compressor series	Adapter selection
Arctic Circle	G2 G4 G6	ADP-A1 Direct connection without adapter is also possible.
Bitzer	4G 4H 4J 4NC 4NHC-20K 4PC 4PHC-15K 4TC 4THC-12K 4VC 4VHC-10K 4VNC 4Z 6F 6G 6H 6J 8FC 8GC S4 S6 4 - CTC, DTC, FTC, HTC, JTC, KTC, MTC, PTC	ADP-A1 Direct connection without adapter is also possible.
	2CHC-4K 2DC 2DHC-3K 2EC 2EHC-3K 2FC 2FHC-3K 2GC 2GHC-2K 2HC 2HHC-2K 2JC 2JHC-07K 2KC 2KHC-05K 4CC 4CHC-9K 4DC 4DHC-7K 4EC 4EHC-6K 4FC 4FHC-5K 4KTC-10K	ADP-A3
	ZL ZM	ADP-A4
Bock	HA 4 HA 5 HA6 HG 4 HG 5 HG 6 HG 7 HG 8 GX4/310-4 HGX4/385-4 HGX4/464-4 HGX4/555-4 HAX2...CO2 T HGX34 / 46...CO2 T	ADP-A1 Direct connection without adapter is also possible.
	HA12 HA22 HA34 HG12 HG22 HG34 HGX12P/40-4 HGX12P/50-4 HGX12P/60-4 HGX12P/75-4 HGX22P/110-4 HGX22P/125-4 HGX22P/160-4 HGX22P/190-4 HGX34P/215-4 HGX34P/555-4	ADP-A3
Carrier	EA ER	ADP-A1 Direct connection without adapter is also possible.
Copeland	4CC 6CC D2 D3 D4 D6.H D6.S D9 DM D8D D8S_ (except D8SJ and D8SK, installation only on one sight glass) 4MSL, 4MTL	ADP-A1 Direct connection without adapter is also possible.
	DK DL	ADP-A3
	ZB15 to ZB48 - until 06/2014 ZBD21 to ZBD45 - until 06/2014 ZB56, 75, 92, 11 - until 05/2012 ZF06 to ZF25 - until 06/2014 ZF24 to ZF48 - until 05/2012 ZS21 to ZS45 - until 06/2014 ZS56 to ZS11 - until 05/2012 ZO34 to ZO104 - until 06/2014 ZOD34 to ZOD104 - until 06/2014	ADP-A4
	ZB220 ZF24 to ZF48 ZH100/125/150 ZR90, 11, 12, 16, 19, 250 to ZR380 ZS56 to ZS11 ZP180 ZP235 to ZP485	ADP-A7
	ZB15 to ZB48 - after 06/2014 ZB50, 58, 66, 76, 95, 114 ZBD21 to ZBD45 - after 06/2014 ZF06 to ZF25 - after 06/2014 ZF(D)18 - after 06/2014 ZF48 ZH40/45/50/64/75 ZP90/103/104/120/122/137/154/182 ZR94/108/125/144/160/190 ZS21 to ZS45 - after 06/2014 ZO21, ZO34 to ZO104 - after 06/2014 ZOD34 to ZOD104 – after 06/2014	ADP-A6
Dorin	K Series (except for the models listed below) SCC500 B SCC750 B SCC1500 B SCC1900 B SCC2000 B SCC2500 B SCS340 D SCS351 D SCS362 D SCS373 D SCS385 D SCS3K8 D H Series(except H1) CDxx M H B CD2S-200, -400	ADP-A1 Direct connection without adapter is also possible.
	H1 K100CC K100CS K150CC K150CS K180CC K180CS K200CC K230CS K235CC K240SB K400CC K50CS K75CC K75CS SCC250 B SCC300 B SCC350 B SCC380 B	ADP-A3
Frascold	A A-SK B D D-SK F F-SK Q-SK S S-SK V W Z	ADP-A1 Direct connection without adapter is also possible.
L'Unité Hermétique	TAG TAH	ADP-A3
Maneurope	LT MT SM SZ	ADP-A3
Prestcold	P2 P3 P4 P6 P8 P9	ADP-A1 Direct connection without adapter is also possible.

Our applications engineering advice and the information contained in this guideline are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee.

Adapters for oil level regulator

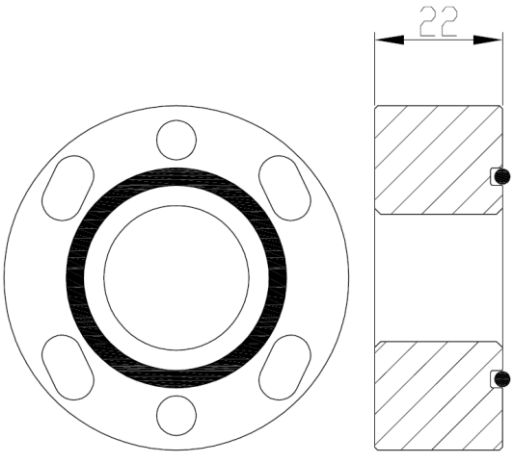
ADP-A1

Flange 3/4/6 holes - Spacer 50mm



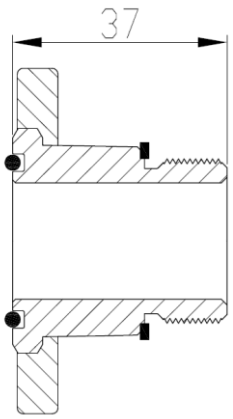
ADP-A2

Flange 3/4/6 holes - Spacer 22mm



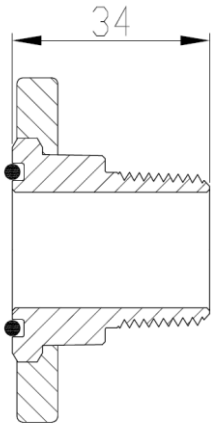
ADP-A3

1.1/8"-18 UNEF



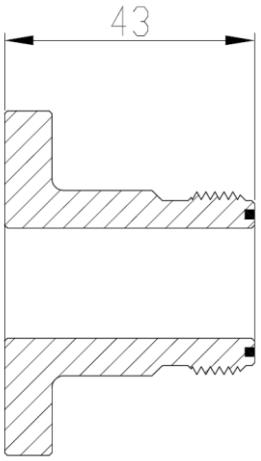
ADP-A4

3/4"-14 NPT



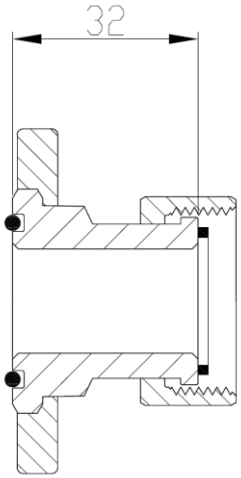
ADP-A5

Rotalock 1.1/4"-12 UNF



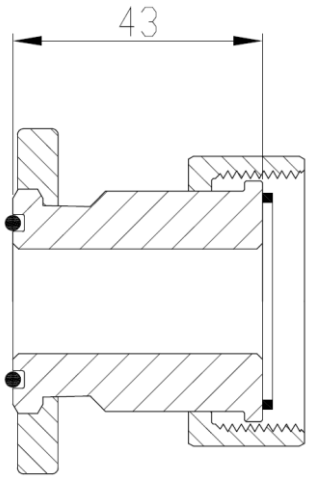
ADP-A6

Rotalock 1.1/4"-12 UNF



ADP-A7

Rotalock 1.3/4"-12 UNF

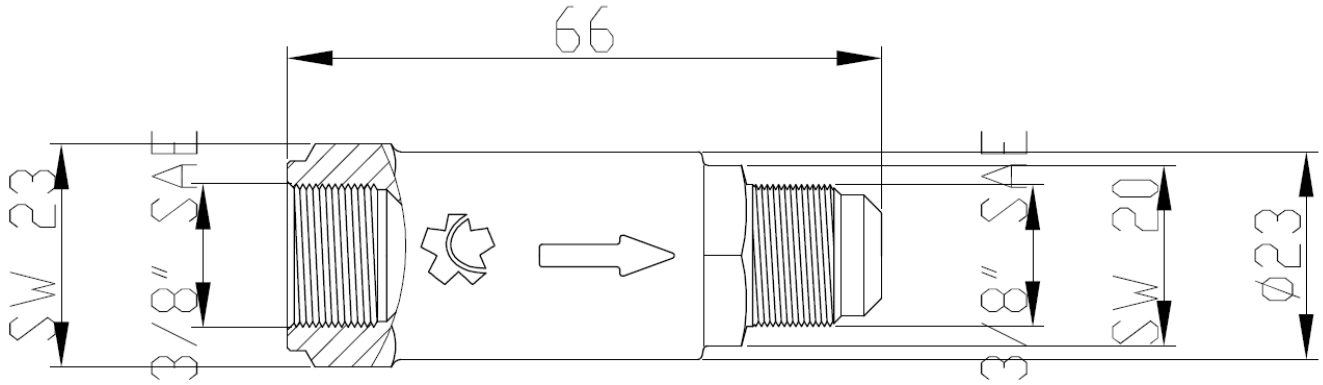


Adapter	Description	Cross reference	Material
ADP-A1	Flange 3/4/6 holes 50 mm spacer	Equivalent to Emerson Traxoil CUA, CCC, CUD	Brass EN 12164, EN 12165
ADP-A2	Flange 3/4/6 holes 22 mm spacer	-	
ADP-A3	1.1/8"-18 UNEF (male) with copper gasket	Equivalent to Emerson Traxoil CCB	
ADP-A4	3/4"-14 NPT (male)	Equivalent to Emerson Traxoil CCA	
ADP-A5	1.1/4"-12 UNF Rotalock Fitting (male) with PTFE Teflon® gasket	-	
ADP-A6	1.1/4"-12 UNF Rotalock Nut (female) with PTFE Teflon® gasket	Equivalent to Emerson Traxoil CCE	
ADP-A7	1.3/4"-12 UNF Rotalock Nut (female) with PTFE Teflon® gasket	Equivalent to Emerson Traxoil CCD	

Differential oil check valve 3,5 bar

Optimized for NOVO magneto-electronic oil level regulator

The **NOVO-RV35** differential oil check valve is useful to vent pressure in the oil reservoir/separator while still maintaining a positive pressure differential of 3,5 bar between the reservoir and the compressor sump. This positive pressure ensures an adequate oil supply to the mechanical oil level regulator. The NOVO-RV35 oil reservoir pressure valve is directly mounted on the 3/8" SAE Flare connection of the reservoir and is piped to the suction line.



Approvals

CE (PED, RoHS, REACH), EAC

Supply

IGLOO NOVO differential oil check valves are singly packed into carton boxes, with annex fitting instructions and CE certificate of conformity.

Technical data

NOVO differential oil check valve:

NOVO-RV35	HFC, HCFC, CO_2	-40 ÷ +105 °C PS 60 bar PT 85 bar	Diff. pressure: 3,5 bar	Inlet: SAE f-3/8" Outlet: SAE m-3/8"

PS = Max. working pressure PT = Max. test pressure

Materials

Body: Forged brass EN12165
Internal parts: Turned brass EN12164
Spring: Austenitic stainless steel AISI 302
External sealing: CR Chrloroprene rubber
Internal sealing: Special PTFE