LAUPER INSTRUMENTS JCC Gas Detection User Manual

Contents

LAUPER INSTRUMENTS JCC Gas Detection

Introduction

Series Jcc gas conditioners are designed to deliver pre-conditioned sample gases to moisture-in-tolerant extractive gas analysis equipment. All necessary devices to deliver dehumidification of wet sample gas and remove the condensate are ready to use and installed in one housing. They ensure reliable conditioning of gases to enhance analysis results. Because water vapors are suppressed, analyzers can be used in continuous operation at low maintenance.

Housing options

To meet all requirements the Jcc series are available in
4 housing variants:

- 19“ Rackmount
- Wall mount housing for lengthwise mounting
- Wall mount housing for crosswise mounting
- Portable

Versatile usage
Jcc sample gas conditioning units are available as a mono or dual heat exchanger and the appropriate amount of condensate pumps. Options include sample pumps, filters, condensate detection monitors, and flow monitoring and control, to build complete gas conditioning units. In case of a dual heat exchanger, the heat exchangers are connected in series. This boosts the cooling efficiency and allows higher environmental temperatures.

General safety information

Sample gas conditioners are sophisticated devices intended for use by qualified personnel only. It is necessary that this manual has been read and understood by those who will install, use and maintain this equipment. Operation of the sample gas cooler has to be done also according to the effective security regulations and rules for accident prevention.

Nonobservance may lead to personal injury and or material damage. JcT does not take liability for nonobservance of security advice, rules and laws that are referenced in this manual. This includes installation, operation, maintenance and service and also if it is not written in this manual.

JcT Analysentechnik Gmbh is not responsible for arbitrary changes on the device nor for inappropriate operation or use. If hazardous-free operation of the module is not possible, the user must stop operation and prevent further use

The reasons for putting the module out of order are:

- Unit is visibly damaged
- if the equipment does not work any longer
- incorrect storage under inappropriate conditions
- if the device has been subject to frequent moving

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Special instructions
The sample gas conditioning unit is designed for use in gas analysis systems only. Please observe the technical specifications with respect to operation purpose, material combination and admissible pressure and temperature limits. The unit is not suitable for operation in hazardous areas. All operations on the sample gas conditioning unit have to be done according to the effective security regulations, rules for accident prevention and all other prescriptions which may be considered. Furthermore with the regulations for use of FkW / hFkW (Bulletin Zh1/409) and for disposal of condensate (Federal Water Act) need to be observed.

CAUTION!
Shut down the sample gas flow before removing any gas connections or condensate separation components.

CAUTION!
condensate may contain hazardous or corrosive substances! Wear appropriate protective clothing!

Intervention in safety- and security devices and also in refrigerant leading pipes and the gas heat exchanger is not permitted. Manipulation of refrigeration circle is only allowed by JcT Analysentechnik or personnel which is advised and authorized by JcT.

Transport and storage

CAUTION!

Before transporting or storing the sample gas cooler, remove the gas heat exchanger and ship it with the delivered packaging material. Transport the sample gas conditioning unit in a working position only! See the markings printed on the transport package! Transport and storage temperatures may not exceed -25°c to +63°c. hereby ambient humidity may not exceed 90%.

CAUTION!
After transport or installation wait for at least 2 hours until the start of operation! Place the sample gas conditioning unit on a flat surface or mount it horizontally.

JCC Models

L								Wall mounting on rear panel	Basic unit
Q								Wall mounting on side panel	
R								19" rack housing	
P								Portable housing	
	1							1 Mono gas heat exchanger PVDF, 1 condensate pump	Gas heat exchanger
	4							1 Dual gas heat exchanger PVDF, 2 condensate pumps	
		1						Fine dust filter—one way	Fine dust filter
		2						Fine dust filter JF-1 incl filter element	
			2					Sample gas pump < 200Nl/h	Sample gas pump
			4					Sample gas pump < 200Nl/h incl relay for remote control	
				4				Flow meter with needle valve 10...100 Nl/h	Gas flow control
				5				Flow meter with needle valve incl flow alarm	
					0			Without condensate sensor KW-2	Condensate detector
					1			With condensate sensor KW-2	
						1		230 VAC 50/60 Hz	Power supply
						3		115 VAC 50/60 Hz	
									Order code

NOTE
Some possible combinations of options are technically futile and therefore not available. Please consult the JcT sales team before placing the order.

Technical data

Heat exchanger	**Mono**	**Dual**
Number of gas paths	1	1
Dew point outlet	+3°c	
Operation		
Flow rate	max. 250 l/h	125 l/h
Gas temperature inlet	max. +140°c	
Dew point inlet	max. +70°c	
Ambient temperature	+5… +45 °c	
Operating pressure	0,5 … 2,2 bar abs.	
Death volume	67 ml	110 ml
Ready for operation	< 15 min	
Pressure drop at max. flow rate	20 bar	9 bar
Dew point reference data		
Flow rate	100 l/h	
Ambient temperature	+25°c	
Dew point stability	±0,3 k	

Electrical	
Supply voltage	230 VAc 50/60 hz or 115 VAc 50/60 hz
Power consumption (depending on load, am- b ient temperature and configuration)	approx. 300 VA
Supply connection	approx. 2m open wire ends portable model: plug cEE 7/7 to IEc Plug, l = 2 m
cooling element	cpmressor with hot gas bypass
Fusing	External on installation site, fuse characteristic c; 230VAc 6A; 115VAc 10A portable model: internal fuse T6.3A / T10A
Protection class	IP 20 (EN 60529)
On-time	100 %
Alarm set points	<0 / >+10°c
Status / Alarmrelay	Volt free change over contact SPTD
connection status signal	open wire ends, l = 1,2m portable model: Binder 693
Switching capacity relays	max.250VAc, 2A, min. 5VADc/5mA
Operating frequency	max. 10/h

Subject to change without notice

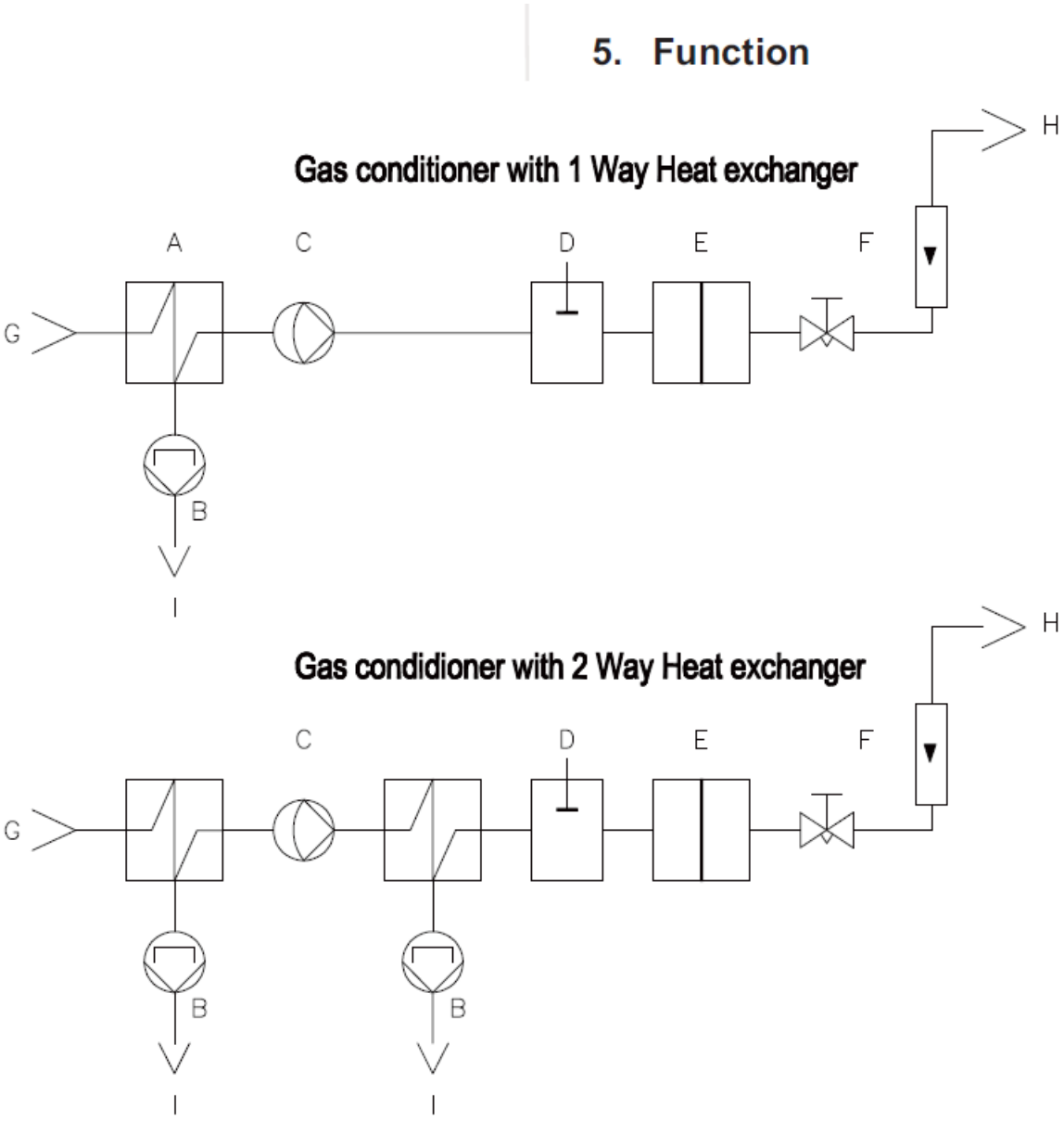
Order codes

For spare part orders please submit a component description and part. no. and also the serial number registered on type plate of the appliance.

Part No..	Consumables
12.90392	hose set condensate pump (5 pcs.)
K1233155	consumables kit for sample pump
B1911010	Disposal filter (3 pcs.)
17.90001	O-ring seal for filter housing (3 pcs.)
17.00002	Filter element glas fiber (5 pcs.)
17.00003	Filter elecment PTFE (3 pcs.)
K1233011	Tubing cover condensate pump
	Spare parts
820 0013	Fan 230 VAc
820 0021	Fan 115 VAc
460 0609	Temperature display 230 VAc, 50/60 hz
460 0614	Temperature display 115 VAc, 50/60 hz
460 0152	Temperature sensor
410 0113	condense drain tube with O-ring
K1204360	condensate detector electronic kW-2

17.04000	condensate sensor kW-1
K1233002A	condensate pump complete
K1233009A	Pulley holder condensate pump
32.90520	hose set condensate pump Acidflex for aggress- sive condensate (4 pcs.)
32.90521	Pulley holder condensate pump Acidflex
123 6302	Elbow connector for filter element (2 pcs.)
410 0101	Gas heat exchanger PVDF Mono
410 0102	Gas heat exchanger PVDF Dual
K1233151	Sample gas pump 230 VAc
K1233153	Sample gas pump 115 VAc
K1233014	Pump housing with latch
K1907806	Gateway RS485/USB
K1233066	Synchronous motor
K4100115	Thermal compound

Function



A	Gas heat exchanger
B	Condensate pump
C	Sample gas pump
D	Condensate detector (option)
E	Filter element
F	Flow meter with needle valve
G	Sample gas inlet
H	Sample gas outlet
I	Condensate outlet

Gas flow diagram
These components are assembled and ready to operate in a sheet steel housing:

- Power-regulated cooling circuit with chiller
- Thermostat-controlled axial fan
- heat exchanger
- condensate pump(s)

- Sample gas pump
- Flow meter with needle valve
- Filter element
- Temperature display and temperature monitor
- Gas- and electrical connections
- condensate detector (option)
- Flow control (option)

Gas heat exchanger
The gas flow is designed to bring the wet gas in contact with the cooled surfaces. The outside of the heat exchanger is thermo-insulated. This prevents the condensation of humid ambient air on the outside of the heat exchanger

Cooling
A chiller-powered cooling system is used for cooling. A fan is used for the continuous removal of waste heat to the environment.

Condensate removal
To ensure continuous removal of condensate the Jcc is equipped with the JSR-25 condensate pump (approx. capacity 0,30 l/h).

CAUTION!
To avoid leakage of the condensate pump the operating pressure must be between 85 – 220 kPa abs. The tubing of the condensate pump is subject to wear and has to be checked regularly and replaced, if necessary.

Condensate detector and temperature control
The sample gas conditioning unit Jcc is optionally equipped with the condensate sensor kW1. The built-in electronic module monitors with the condensate sensor kW1 an eventually occurring condensate through break. At the same time the temperature of the gas heat exchanger is monitored. The alarm relay is operated in working principle and is equipped with two-volt free alarm contacts. (i.e. Energized in “good” condition). When condensate is detected or the temperature limits are reached alarm is indicated visually and via the alarm relay.

Condensate detector (option)
The built-in condensate sensor is used for the detection of eventually occurring condensate through the break. When condensate is detected the indicator lights up and the status relay drops immediately. A resuming of control operation is only possible by cleaning and drying the sensor element. The volt-free signal can be used externally through a status plug on the instrument. The built-in condensate sensor is used for the detection of eventually occurring condensate through break. When condensate is detected the indicator lights up and the status relay drops immediately. A resuming of control operation is only possible by cleaning and drying the sensor element. The volt-free signal can be used externally through a status plug on the instrument.

The factory default setting for the set point is approx. 12 kΩ.
The adjustment of the response resistance set value is possible via PcB-mounted multipolar DIL switches. Response threshold adjustment can be done in steps of 2kΩ from 2 to 30kΩ.

Switch No.	Resistance
1	2 kΩ
2	4 kΩ
3	8 kΩ
4	16 kΩ

- Switch 2 and switch 3 activated Ë12kΩ

CAUTION!
condensate may contain hazardous substances! Wear appropriate protective clothing!

Sample gas pump
The sample gas pump forwards the sample gas through the gas conditioner to the analyzer. It can be turned on/off via a switch on the front panel. In case of alarm condition, the pump is locked automatically.

Filter element
Fine dust particles are separated from the sample gas by a filter. Filter elements are available in glass fibre or PTFE materials.

CAUTION!
Stop the sample gas pump before opening the filter housing. Open the filter housing only under pressure-less conditions. The filter element is tight only if the O-ring sealing in filter cap is in place.

Flow meter with needle valve
The cooling power of the sample gas conditioning unit is limited by the condensate volume (dew point at gas inlet), the operation temperature (ambient temp.) and the gas flow. To adjust and display the gas flow, the instrument is equipped with a flow meter with an integrated needle valve.

CAUTION!
Never close the needle valve completely to avoid damage to the system.

Flow monitoring (Option)
The gas flow is monitored by an opto electronic sensor if the sample gas pump is switched on. If the optical way is cut by the float of the flow meter, the electronic controller operates with 10 sec delay volt free contact which is available on the status cable.

CAUTION!
If the measuring glass of the flow meter is soiled, the optical sensor cannot work correctly.

Digital temperature display
The temperature display shows indicate the actual sample gas heat exchanger temperature. In normal operation, LED 3 is illuminated and the status relay alarm is energized. Above a temperature of 7°c the cooler is on overload. If the temperature of the heat exchanger rises above 10°c the status relay alarm is de-energized and LED 1 lights up. (Over temperature alarm)

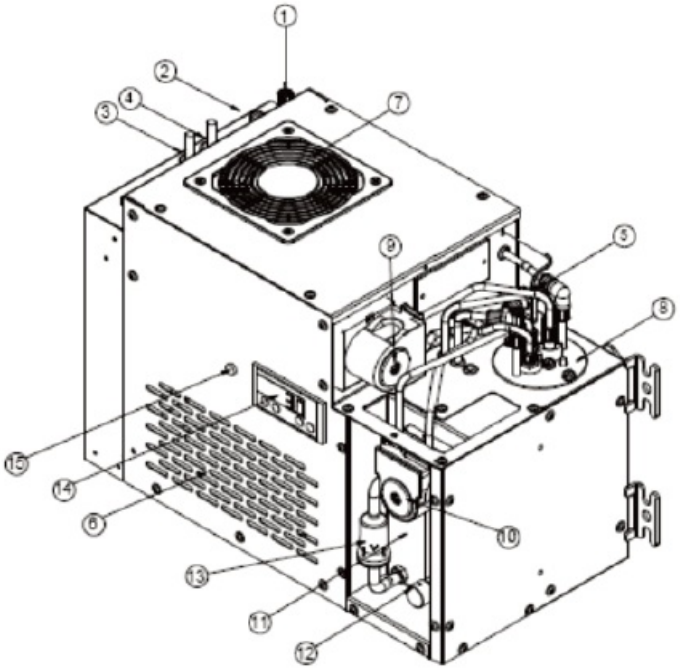
If the temperature of the sample gas heat exchanger drops below 0°c the status alarm relays is de-energized and LED 3 disappears. (Under temperature alarm) In case of power failure, the status alarm relays drops. The alarm relays is performed as a volt-free contact. The status signal is transferred with a control wire with open wire ends out of the unit.

1	Dew point Tp > +10°C
2	Bypass valve on
3	Ready status
4	Button UP
5	Button DOWN
6	Dew point / Set value button
7	No function

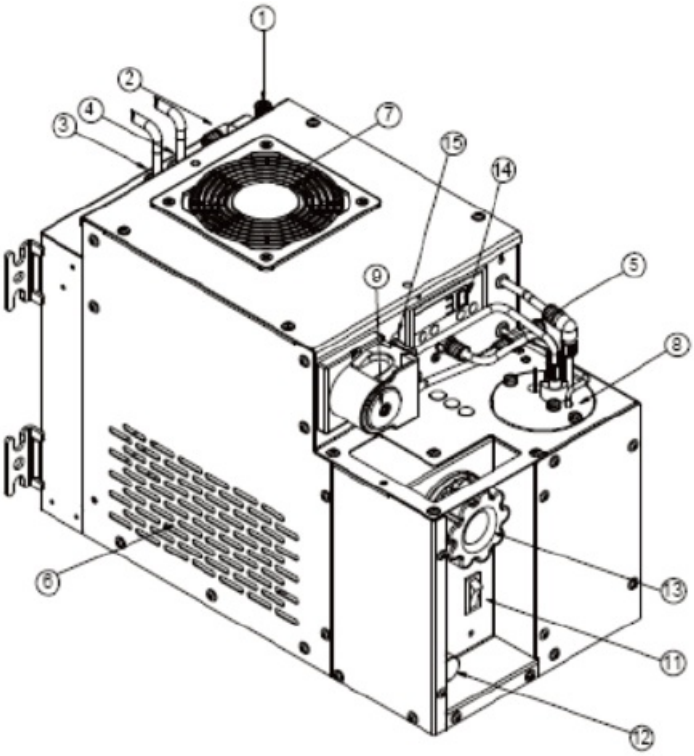
Fault display

Anzeige / Display	Cause
F I L	Dew point sensor shorted
F I H	Dew point sensor break
EP	Memory fault

Operating elements 5.12. and indicators
Front view
Jcc-Q: Wandmontage quer / wall mounting crosswise



Jcc-L: wall mounting lengthwise



1	Sample gas inlet
2	Sample gas outlet
3	Supply connection
4	Status contact
5	Condensate outlet
6	Ventilation inlet
7	Ventilation outlet
8	Heat exchanger
9	Condensate pump 1
10	Condensate pump 2
11	Pump switch
12	Flowmeter with needle valve
13	Filter element
14	Temperature display
15	Alarm indicator

Installation unpacking

check the instrument for any damage caused by shipping. If any damage is established, contact the carrier and distributor immediately.

check the instrument and any other parts against the order

Installation instructions

- Disconnect mains before working on the electrical part of the equipment.
- keep sufficient clearance around the unit for maintenance and the ventilation of the sample gas conditioner.
- The equipment has to be connected and grounded according to the local rules and regulations.
- The device is designed for use in indoor areas. Pay attention to adequate ventilation especially when installed in closed housings, f.i. analysis cabinets. If adequate ventilation, for technical or structural reasons, is not possible, it is recommended to use a forced air cooling, fan or air conditioner, which must have no impact on the unit´s ventilation.

Mounting

- Observe mounting position according to specification.
- Protect the unit from excessive exposure to sunlight or extreme sources of heat and against rain and dirt.
- connect the inlet and outlet of the sample gas heat exchanger(s) and check for leaks
- connect the condensate outlet to the condensate collection system and check for leaks.

Sample gas connection
connects DN 4/6 mm tubing with nut and ferrule at the “IN” and “OUT” gas connections.

Condensate drain
Drain tubing with ferrule and nut with a DN 4/6 mm at the pump fitting.

CAUTION!
The condensate is often acidic. Appropriate safety measures at the draining point should therefore be taken and regulations for the disposal of acid liquids should be adhered to! Wear appropriate protective clothing!

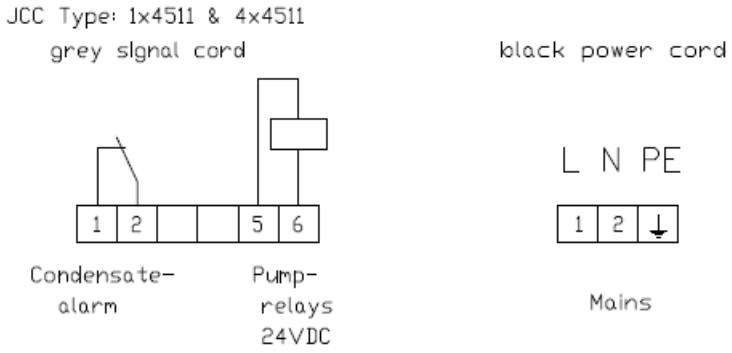
Leakage test
CAUTION!
check all gas connections against leakage after the tubing installation.

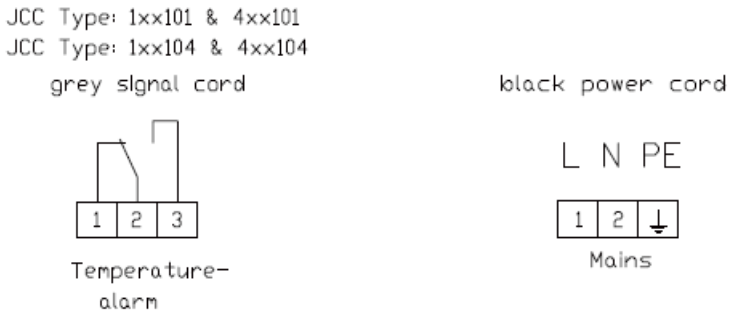
Electrical connections

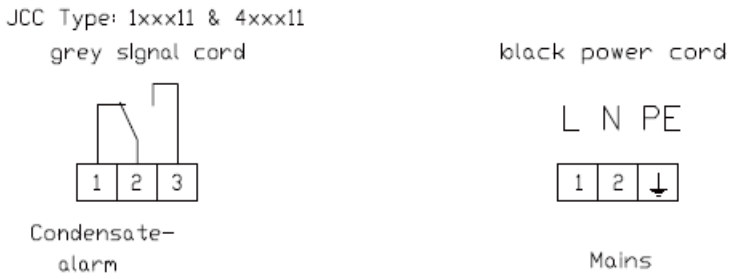
- check local voltage, frequency and power consumption against the type plate.
- connect a 2-pole switch in the main supply; the appliance is not equipped with a switch.
- Grounding of the equipment has to be done on the designated place according to the local rules and regulations.
- The unit is delivered without a plug. The unit must be connected according to laws and rules of the country of installation, the details on the type plate and the wiring diagram.
- The connection must be done by qualified personnel.
- Fusing has to be done externally on the installation site (according to type plate)

Always operate contacts under specified ratings. For the connection of inductive and capacitive loads use suitable protection circuits (e.g. recovery diodes for inductive and serial resistance for capacitive loads). Relays are illustrated in current-less conditions (fail-safe).
connect the status contacts according to the graphic.

Connector plug / terminal strip







CAUTION
This unit is operated with mains power. During operation, some parts of the unit are energized with dangerous voltage! Removing the cover will expose live parts. Before repair or maintenance disconnect from mains. Isolation testing with high voltage is not allowed and can lead in unit damage. Only qualified staff who have been trained according to this manual should operate and maintain this instrument. For certain and safe operation the instrument needs to be transported carefully, be part of a well-planned application, installed correctly as well as operated and maintained according to these instructions.

Requirements of qualifications of staff:
Qualified staff in the sense of this manual and/or the warning references are persons, who are familiar with setup, mounting, start-up, and operating of this product and have sufficient qualifications.

Start-up

1. check of the proper installation.
2. Review the equipment for damage.
3. check for leaks.
4. check for the horizontal position.

CAUTION!
Before switching on the device check rated type plate voltage against line voltage.

Switch on the power supply of the sample gas conditioning unit. chiller and condensate pump (possible start-up delay) are operating. The electronic controller displays the temperature of the gas heat exchanger. After a short start time, the temperature of the gas heat exchanger drops below the upper alarm limit and the volt-free status relay is energized. (Alarm indication: open contact)

- The unit is now ready for operation. The sample gas pump is released. Switch the pump switch in position “PUMP ON”.
- The internal sample pump is switched on by the supply of pump relay with an external supply voltage of 24 VDc.
- Adjust the gas flow with the needle valve at the front panel of the instrument.
- check the whole installation for leaks. Afterward, the installation procedure is complete.

CAUTION!
Observe maximum flow rate in relation to inlet dew point and ambient temperature (see technical specifications).

CAUTION!
Non-compliance with the control steps can lead to serious hazards or property damage and personal injury!

End of Operation

Shut down the sample gas flow through the sample gas conditioning unit by switching off the sample gas pump; keep the sample gas conditioning unit at operation for at least 10 min. (pumping residual condensate). Afterward, shut down the sample gas cooler by disconnecting the mains.

Demounting

- Shut down sample gas flow with sample gas pump.
- Flush appliance with clean air or nitrogen.
- Disconnect units supply at site.
- Unscrew fittings and disconnect all gas connections.
- Remove the probe from the process flange.
- Disconnect the condensate drain.
- Store and dispose of with expertise

Recycling
The unit contains elements that are suitable for recycling and components that need special disposal. you are therefore requested to make sure that the unit will be recycled by the end of its service life.

Maintenance and service

NOTE
If an item is returned to JcT Analysentechnik, for maintenance or repair reasons, it will only be accepted after the RMA form on our website has been completed (**www.jct.at/rma**). This is to ensure the security of JcT staff.

Jcc sample gas conditioners are designed for long-term continuous operation with a minimum of maintenance requirements. Maintenance is limited to cleaning the cooling fins with compressed air, and a periodical check of the sample gas pump, filter and condensate pump tubing against leakage and condition. In continuous operation, a condensate tubing replacement every 3 months is recommended.

CAUTION!
Before any maintenance or repair work is performed on an opened instrument, the power supply must be disconnected. Any repair and adjustment work on the open and powered-up instrument shall only be performed by qualified staff who are fully trained and familiar with the dangers involved! The disposal of the exchanged parts must respect the current environmental, safety and technical regulations.

Condenser
The performance of the sample gas conditioning unit is reduced by a soiled condenser. For maintenance switch the sample gas conditioning unit off and disconnect from mains. Remove the service side panel and clean the cooling fines of the condenser with compressed air or a soft brush. Inspect fouling regularly and do a cleaning if necessary. Time periods depend on location and installation conditions

Diaphragm and valves of sample gas pump
Diaphragm and valves of the sample gas pump are consumables. They should be replaced if the flow capacity is insufficient. Only qualified staff can do this maintenance. Open the instrument and follow the instructions inside of the spare part package.

Condensate pump
condensate pump hoses and tubing covers are consumables and have to be replaced regularly depending on operating conditions or at the latest after 6 months. For replacing condensate pump hoses following actions are necessary:

- Switch the sample gas cooler off (disconnect mains).

CAUTION!
condensate may contain hazardous or corrosive substances! Wear appropriate protective clothing!

Pump tube and tubing cover replacement details

Step 1

Remove both Viton tubes by losing the fitting nuts by counterclockwise rotation

Step 2

Pull off both condensate pump tubes from fittings

Step 3

Remove the treadmill including the pump tube by rotating of lock-clip clockwise

View
Uninstalled treadmill with pump tube

Step 4

Remove the pump tube set (including end parts) from guide rail of the treadmill and replace by a new pump tube set

View
guide rail treadmill in detail

View
guide rail treadmill in detail

Step 5

Mount the treadmill on the pump head, place both end parts in the rail until they snap-in

Step 6

Twist back the lock-clip counter clockwise until both ends snap in properly

Step 7

check the correct pump tube and lockclip position Install Suction and Pressure tubes again and tighten nuts stalwart.

Pulley holder replacements details

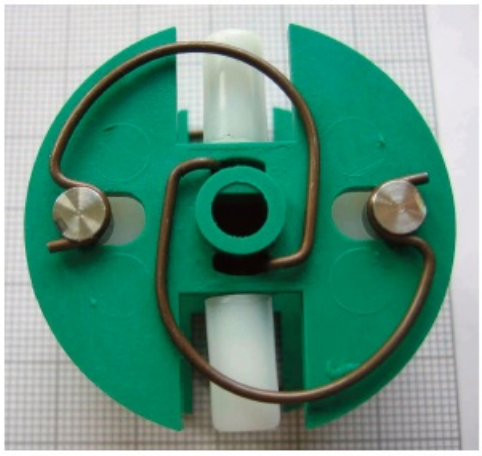
Step 1

Uninstall tubing cover with pump tube (see tube replacement step 1-3) Locate and open the two screws for pump head fixing and pull pump head with pulley holder off

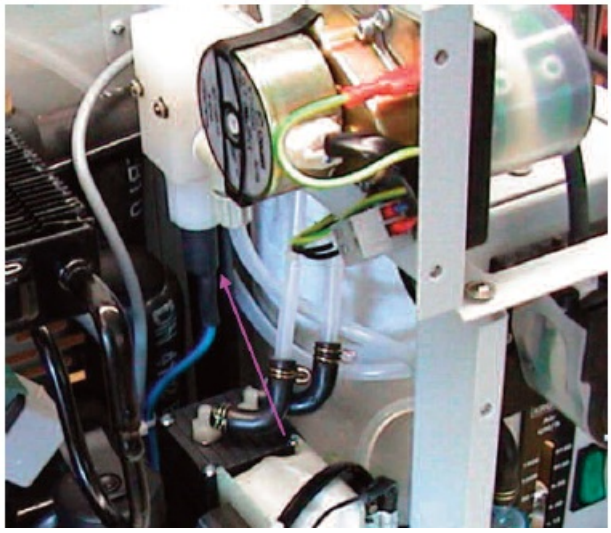
Step 2

Push pump housing with new pulley holder slightly back on the axle, shaftshoulder showing to the front. Take care that all four springs are in the correct position. Fix pump housing with the two screws. Reinstall tubing cover

with pump tube



Condensate sensor
In case of condensate detection fix cause and clean the condensate sensor. Remove the left or right side panel. The condensate sensor is located centrally on the front side.



Open nut and remove the sensor downwards. clean and dry the sensor. Dry also the gas path downstream the heat exchanger. check the unti for leaks before starting the operation.

Filter element
check the filter or rather the one way filter element periodically and replace it if is necess

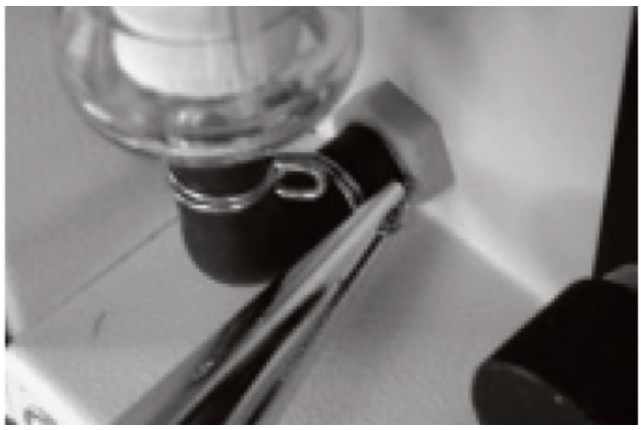
CAUTION!
Stop the sample gas pump and replace the filter element only under pressure less conditions. Filter replacement in detail (disposal filter)

Step 1

Pull back upper hose clip

Step 2

Pull back lower hose clip

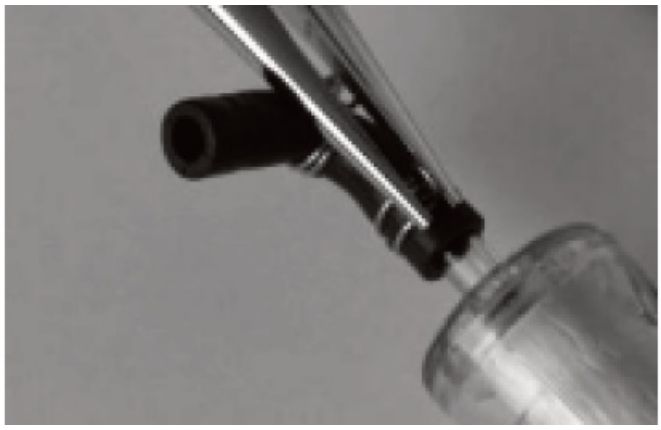


Step 3

Pull off filter element together with both elbow end connectors

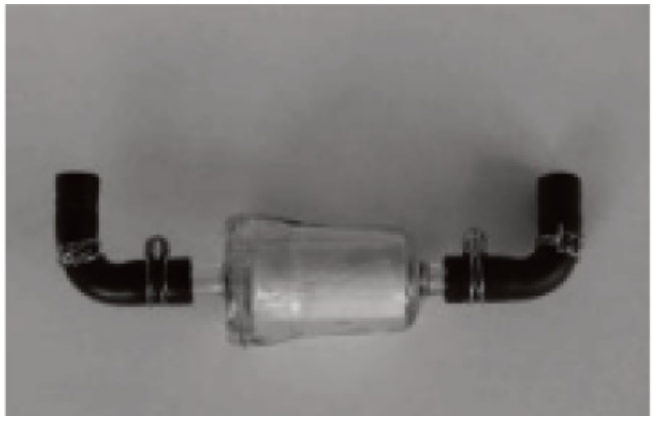
Step 4

Pull back the hose clips on elbow end connectors



Step 5

Slide elbow end connectors on new filter element Mount hose clips Install the filter unit in reverse order



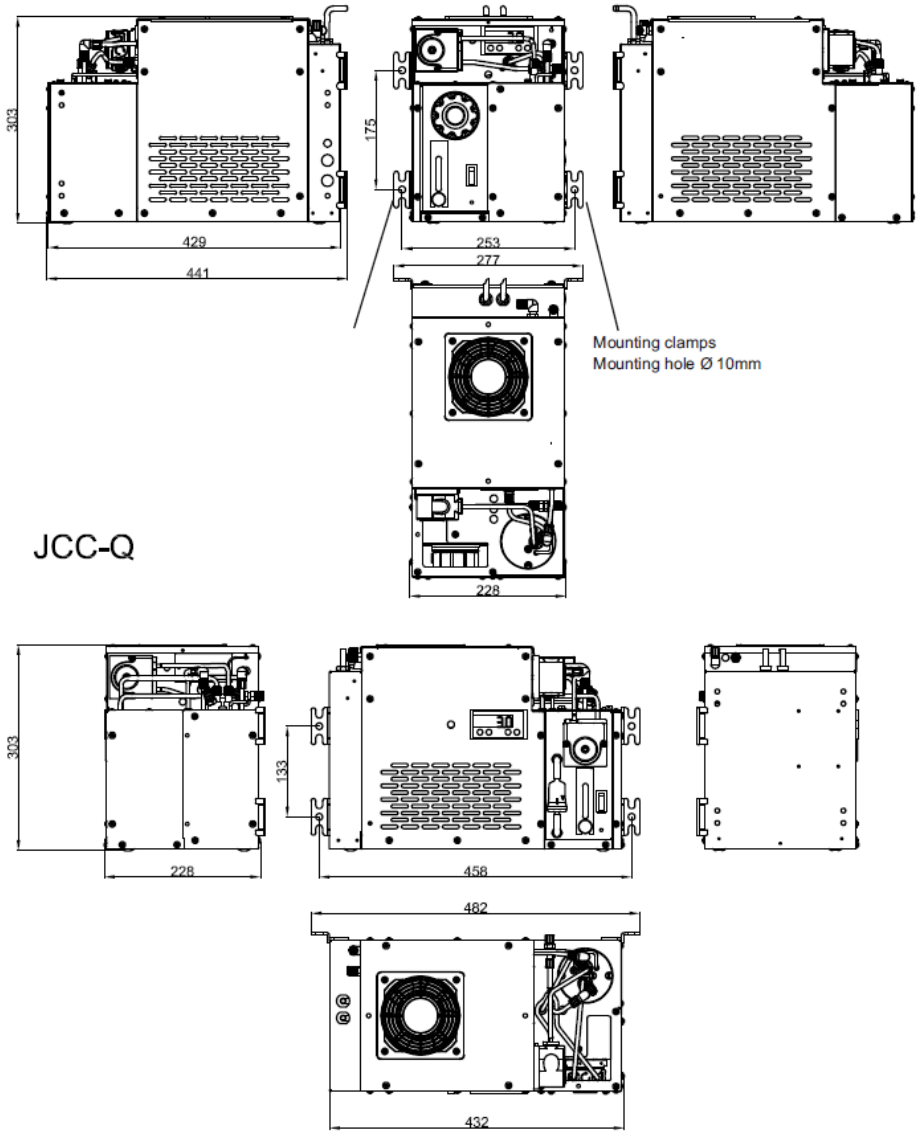
Fault diagnostic check list

Malfunction	**Cause / remedy**
Dark display	• check power supply check appliance fuse • control electronic defective, Replacement by service • Safety delimiter is triggered System control by qualified personnel. Remove side cover and push reset but- ton o f safety delimiter. In case of recur- rence send the device to JcT for repair.
Temperature above 10°c	• compressor defective call JcT service • Sample Gas flow too high Reduce sample gas flow, • Ambient temperature too high check specification • condenser dirty clean condenser • condenser fan defective Replace fan by qualified staff call JcT service
Temperature below 0°c	• Power regulator defective call JcT service • Ambient temperature too low

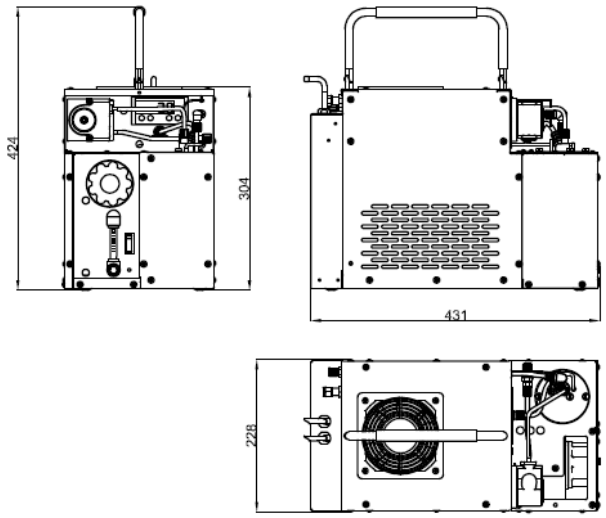
Wet sample gas	• compressor defective call JcT service • Sample gas flow too high Reduce sample gas flow rate, check specification • condenser dirty clean condenser • Fan defective Replace fan by qualified staff, call JcT service • Jamming condensate pump Replace tube set, call JcT service
blocked sam- ple gas flo w	• Sample filter JF1 blocked Replace filter cartridge
	• Flow meter needle valve insufficient open
	• Fouling caused by not yet separated dust or sublimate Use of pre filter clean sample gas tubes and sample gas heat exchanger check compatibility before using cleaning agents
	• Sample gas pump defective call JcT service
condensate- alarm	• Eliminate the cause (see wet flue gas) Remove condensate sensor by unscre- wing nut and pulling downwards, clean and dry sensor

Malfunction	**Cause / remedy**
Sample gas pump stops	• Eliminate the cause (see wet flue gas) Remove condensate sensor by unscre- wing nut and pulling downwards, clean and dry sensor • kühler überlastet
compressor is not run- ni ng	• Safety delimiter is triggered System control by qualified personnel. Remove side cover and push reset but- ton o f safety delimiter. In case of recur- rence send the device to JcT for repair. • Internal over temperature protection is activated Ambient temperature too high or max. operating frequency is exceeded compressor starts automatically after cool down.

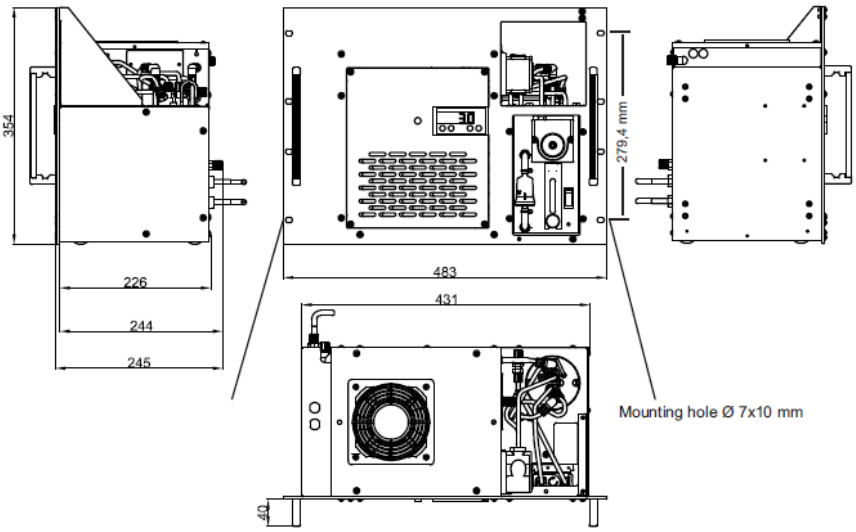
Dimensions



Manual Jcc



JCC-R



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- www.lauper-instruments.ch.

Documents / Resources

	LAUPER INSTRUMENTS JCC Gas Detection [pdf] User Manual JCC Gas Detection, JCC, Gas Detection, Detection

References

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