

# HYGROPHIL F 5674

Inline Moisture Analyzer - Evaluation and Control Unit



### General

Type	HYGROPHIL F 5674 (HYF 5674) Evaluation and control unit for measuring sensor(s) L166x and optional pressure sensors
Variants	– Single Channel (AC or DC) – Multi Channel 1,2,3 (AC or DC)
Serial number (SN)	YYMMXXXXBB (YY = year, MM = month, XXXX = consecutive number, BB = BARTEC BENKE)
Layout	HYGROPHIL F: 19"-Slide-in Device HYGROPHIL F: Table-top Device HYGROPHIL F: Ex d Enclosure (in preparation)
Lifetime	max. 15 years, depending on application, environmental conditions and maintenance/repair
Method	Measuring sensor L166x – Secondary, optical – Signal evaluation of the Fabry-Pérot interferometer using a spectrometer – correlative to the reference method (dew point mirror)
Measuring Mode	cyclic
Measuring Time (cycle time)	Update of one averaged result in less than 5 s. Single Channel System < 5 s Multi Channel System < 15 s (all results)
Sensor Channel Count	L166x: 1.. 3
Heatup Time First Start	typical 30 min

### Intended Use

The device is intended exclusively for industrial, stationary operation indoors. It is used to control and evaluate the connected measuring sensors, which are used to analyze gaseous or liquid hydrocarbons and other gaseous or liquid chemical substances suitable for this type of measurement in the production process using optical technology. The HYGROPHIL F evaluation unit is intended for indoor use only. It must not be operated outdoors! The device is designed exclusively for the use of measuring sensors of the type L166x supplied by BARTEC BENKE and the associated fiber optic hybrid cable for moisture measurement. Spare parts for the system must only be obtained from BARTEC BENKE.

### Special Functions

- Continuous measurement of sample temperature and relative humidity
- Suitable for measurements in gases and liquids
- Suitable for installations in hazardous areas
- Suitable for inline, online and atline installations
- Calculations (e.g. VP, FP and MC) acc. to ITS-90 and GERG
- Calculations considering gas compositions
- Correction of VP for real gases (enhancement factor)
- Calculations at current line pressure and selectable sample reference pressure
- Multi channel support (1..3) and automatic channel switching
- Control unit with Windows 10 and TFT Touch-Panel
- Control unit with remote access interface

- Control unit suitable for upgrade / replacement of preceding units (5672, 5673)
- Control unit with multi lingual user interface (DE, EN, ..)
- Data exchange, backups, software upgrades and calibration updates via USB
- Protected against manipulation (file encryption and container, access level with credentials)

### Electrical Specifications

Rated Voltage	AC: 110..230 VAC ±10% 1Ph.; 50/60 Hz DC: 9..32 VDC, typ. 24 VDC
Rated Current	typ. 0.2 A (AC), 1.9 A (DC) max. 0.32 A (AC), 3.5 (DC)
Power Consumption	typ. 45 W / max. 75 W (AC), max. 60 W (DC)
Fuses	External customer fuses: ≤16 A (AC), ≤10 A (DC), e.g. B or C characteristic Device fuses: 2x T 1A/250V (AC), (DC) no fuse, short-circuit-proof
Main Power Connection Type	AC: (IEC 60320) C14 inlet for connector C13, power cord EU (Type F CEE 7/7) or US/CA(NEMA 5-15) included, power cord length 2 m DC: 3pin terminal connector for customer cable
Others	Reverse polarity protection (DC), line filter (AC)
Additional Installation Recommendation	type 3 surge protection
Overvoltage Category	II

### Requirements for the Installation Site

Untypical vibrations and shocks in the vicinity of the device must be avoided. In this case, the device must be insulated against vibration and shock, e.g. by means of vibration dampers.

The distance between the device and supply lines or components that cause strong mechanical vibrations in the pipe system (e.g. pumps) should be as large as possible.

### Environmental Conditions

Ambient Temperature	Operating: 5..50 °C (AC), 5..45 °C (DC), typ. 15..25 °C Storage: -20..60 °C
Max. rel. Humidity	80%
Ingress Protection (IP)	Front, Top, Side IP40 Back, Bottom IP20
Other	No wet location

### Spectrometer

Repeatability with sensor L1661 / IMT substrate (at T=const und RH=const)	< 10 pm (equivalent to 0.01K @ FP=-55°C)
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### EX Safety Data - Intrinsic Safe In/Output

Environmental Conditions	Outdoor, -20°C to +70°C, 5000 m max.
<b>AI</b>	
Connector location	5674-100 Channel Card - AI 4-20mA (1-4)
Intrinsic Safety (IS)	[Ex ia IIC Ga]
Case	Passive 0..20mA sensor connected
Terminal	4 (+24V), 2 (IN+), 1 (IN-)
Max. voltage U <sub>o</sub>	28 V
Max. current I <sub>o</sub>	93 mA
Max. power P <sub>o</sub>	0.65 mW
Max. resistance R	300 Ω
Max. connectable capacitance C <sub>o</sub>	83 nF
Max. connectable inductance L <sub>o</sub>	3 mH
Internal capacitance C <sub>i</sub>	negligible small (between I.S. wires)
Internal inductance L <sub>i</sub>	negligible small
Safety-related maximum voltage	253 V
if capacitance and inductance are present at the same time	C <sub>o</sub> : 83 nF L <sub>o</sub> : 0.2 mH
Case	Active 0..20mA sensor connected (external I.S. circuit)
Terminal	2 (IN+), 1 (IN-)
Max. voltage U <sub>o</sub>	28 V
Max. current I <sub>o</sub>	≈ 0 mA
External I.S. voltage U <sub>i</sub>	30 V
External I.S. current I <sub>i</sub>	120 mA
External I.S. capacitance C <sub>i</sub>	≈ 0 nF
External I.S. inductance L <sub>i</sub>	≈ 0 μH

### Signal Outputs and Inputs (Logical Specification)

Analog outputs	8 freely assignable channels (TT, SP, WL, VP, RH, DT, FP, PPMv, PPMw, MC...)
Digital outputs	6 Outputs (Error channel n, Limit channel n...)

<b>RTD</b>	
Connector location	5674-100 Channel Card - RTD (1-4)
Intrinsic Safety (IS)	[Ex ia IIC Ga]
Terminal	4 (I+), 3 (IN+), 2 (IN-), 1 (GND)
Max. voltage U <sub>o</sub>	6.7 V
Max. current I <sub>o</sub>	30 mA
Max. power P <sub>o</sub>	50 mW
Max. resistance R	230 Ω
Max. connectable capacitance C <sub>o</sub>	15.4 μF
Max. connectable inductance L <sub>o</sub>	38 mH
Internal capacitance C <sub>i</sub>	2.5 μF
Internal inductance L <sub>i</sub>	0.3 mH
Safety-related maximum voltage	253 V
if capacitance and inductance are present at the same time (pairs)	C <sub>o</sub> (a, b, c): 0.30 μF, 0.2 μF, 0.1 μF L <sub>o</sub> (a, b, c): 0.01 mH, 0.1 mH, 0.15 mH

<b>LED</b>	
Connector location	5674-100 Channel Card - LED
Intrinsic Safety (IS)	[Ex op is]
Max radiation power P	676 μW
Wave length λ	820 nm

### Signal Outputs and Inputs (Electrical Specification)

Analog outputs	6 outputs, 0/4..20mA, active, max. load 1000ohms, reference potential 0V / ground, short-circuit proof connector: Clamp 1..12
Digital outputs	6 potential-free changeover contacts via relays Connector: Clamp 13..30 30 VDC, max. 2 A, max. 60 W 50 VAC, max. 1.2 A, max. 60 VA
Auxiliary voltage output	24 VDC, max. 500 mA Connector: Clamp 31-33 (+24VDC, GND)
Modbus RTU	RS485, baudrate 1200..11520 Connector: Clamp 34..36
Modbus TCP/IP (Option)	Parameter configurable also via external webbrowser Connector: Port MB TCP

### User interface

Display	Windows with 7" touch display, 800 x 480 pixels
Keys	Virtual keyboard, operable via display, optional USB keyboard
Remote control	Ethernet e.g. via Teamviewer or VNC

### Customer interface

Hardwired	Clamp 1..30
Modbus RTU	Clamp 34..36
Modbus TCP/IP (Option)	Port MB TCP, RJ45
USB 3.0 (Front)	Type A, for Backups / Updates and Service
Ethernet	Port LAN, RJ45, for Remote Access
Other	Upon request

### Measures and weight

Measures (W x H x L)	449 x 176 x 255 mm 17.7 x 6.9 x 8.9 inches
Weight	approx. 8 kg approx. 17.6 lbs
Space requirement	for 19" Rack 4HE or as table device, leave space underneath for cooling

### Options

Number of measurement channels	Single Channel = 1 Multi Channel = 1, 2 or 3
Modbus/RTU	Customer interface, RS485
Modbus/TCP	optionally internally installed optionally with external converter
Remote maintenance	via optional software

### Standards

Case Ingress Protection	EN/IEC 60529
EMC	EN 61000-6-2, EN 61000-6-4, EN 61326-1, EN 55011, FCC 47 CFR Part 15 B
Device Standard	EN/IEC/UL/CSA 61010-1
CB-Scheme	yes
Marking	cTUEVus, CE
Marking (5674-100 Channel Card Ex i)	cCSAus, IECEX, ATEX