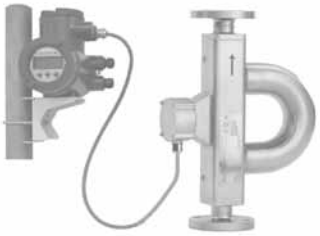
General Specifications

ROTAMASS 3 Series
Coriolis Mass Flow and Density Meter

GS 01R04B04-00E-E

RCCT39/XR

RCCT34 - 39/IR



RCCF31 +
RCCS34 - 39/IR

RCCS30LR - 33

RCCR31

ROTAMASS is the integral and remote type Coriolis Mass Flowmeter. Both types have highly refined digital signal processing electronics, so that accurate and stable mass flow measurement is achieved.

ROTAMASS employs a flame-proof type converter case suitable for use in the hazardous area together with it's intrinsically safety type detector.

ROTAMASS´s signal processing, housing protection and its detector´s special decoupling system against external loads and vibrations, realize high performance in real applications.

PRINCIPLE OF MEASUREMENT

Mass flow measurement according to the Coriolis principle. Almost all fluids including multi phase fluids, high viscosity liquids (pastes and slurries) and liquid with a certain content of gas. For difficult fluids (e.g. abrasive or highly corrosive fluids) and gases please contact your Yokogawa representative.

FEATURES

- Field transmitter type mass flowmeter for nearly all fluids, including high viscosity liquids, slurries and multi phase media
- Field-mount and rack-mount remote converter available
- Refined digital signal processing enables accurate and stable measurement
- A special detector decoupling system makes the device highly independent from external loads or vibrations.
- Simple flow path means self-draining, food capable and simple to clean
- High accuracy and high stability over a wide range
- Accurate density measurement, up to +/- 0.0005 g/cm³
- Concentration measurement for solutions, suspensions and emulsions (e.g. water cut, net oil computing)
- Volume flow with reference density
- Two analog outputs, 2 pulse outputs or status-out and one status-in as standard I/O
- Available in explosion proof versions (ATEX, FM, IECEx, GOST/RTN, INMETRO, NEPSI, KOSHA)
- European MID approval acc. OIML R-117-1 and American NTEP approval for Custody Transfer Measurement (see GS 01R04B07-00E-E)
- FMEDA report on request, SIL 2; SIL 3 levels can be achieved if redundant meters are used
- Wide temperature range –200°C to 350°C
- Microprocessor-based multifunction capability
- EEPROM protects parameter settings and totalized values during power failure of any duration
- High visibly LCD display
- HART® communication function
- Optional Foundation™ Fieldbus communication (see GS 01R04B05-00E-E)
- Optional MODBUS® communication
- Optional intrinsically safe outputs
- Choice of tube materials
- EN, ASME or JIS flanges as standard, others on request

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GS 01R04B04-00E-E

17th edition, May 2013 (Rü)

PERFORMANCE SPECIFICATIONS

Model

- Remote detector RCCS30LR to 33: 2 tubes, low flow design
- Remote detector RCCS34 to 39/XR : 2 tube design
- Remote field-mount converter RCCF31
- Remote rack-mount converter RCCR31
- Integral type RCCT34 to 39/XR: 2 tube integral design

Fluid to be measured : Liquid, gas or slurries

Measurement Items : Mass flow, density, temperature and derived from these values: concentration, volume flow and net flow

Mass Flow Measurement

Table 1: measuring range

Type		RCCS30 LR	RCCS30	RCCS31	RCCS32	RCCS33
Qmax	t/h	0.04	0.1	0.3	0.6	1.5
Qnom	t/h	0.021	0.045	0.17	0.37	0.95

Type		RCCx34	RCCx36	RCCx38	RCCx39	RCCx39 /IR	RCCx39 /XR
Qmax	t/h	5	17	50	170	300	600
Qnom	t/h	3	10	32	100	250	500

Qnom is the water flow rate at about 1 bar pressure drop.
The flowmeter has a default low cut of 0.05% of Qnom.

Accuracy mass flow (refer to table 2)**:**

Liquid RCCS30LR:
± 0.15% of flow rate ± zero stability / flow rate *100%
Liquid RCCS30 - 39/XR:
± 0.1% of flow rate ± zero stability / flow rate *100%
Gas (option /GA):
± 0.5% of flow rate ± zero stability / flow rate *100%

Accuracy volume flow **:**
SQRT ((mass flow error in %)² + (density error in %)²)
Please refer to the Yokogawa sizing software.

Accuracy based on the frequency output includes the combined effects of repeatability, linearity and hysteresis.

Repeatability for liquids:
± 0.05% ± (zero stability/2) / flow rate *100%

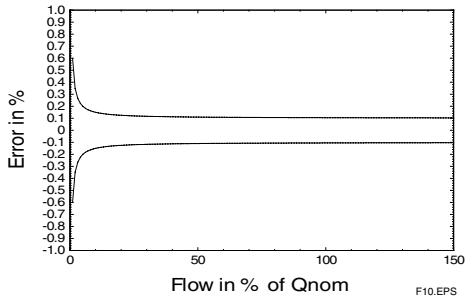


Table 2 : Zero stability

Type	RCCS30 LR	RCCS30	RCCS31	RCCS32	RCCS33
kg/h	0.003	0.005	0.0085	0.019	0.048

Type	RCCx34	RCCx36	RCCx38	RCCx39	RCCx39 /IR	RCCx39 /XR
kg/h	0.15	0.5	1.6	5	13	25

Pressure Dependency

The stiffness of the ROTAMASS tubes is slightly line pressure dependent. The static pressure effect of mass flow and density can be corrected by setting the static pressure manually via menu.

Table 3 : Static pressure effect on mass flow (if not corrected)

Type		RCCS30 LR	RCCS30	RCCS31	RCCS32	RCCS33
% of rate per bar	SH	----	----	----	----	----
	HC	0.00000	0.00000	0.00012	0.00246	0.0035
Type		**RCCx34**	**RCCx36**	**RCCx38**	**RCCx39**	**RCCx39 /IR**
% of rate per bar	SS	0.00081	0.00346	0.00950	0.01058	0.02920
	HC	0.00084	0.00336	0.00896	0.00808	0.01780
Type		**RCCx39 /XR**				
% of rate per bar	SS	0.00740				
	HC	----				

Density Measurement

Adjustment with water and air at calibration temperature.
Measuring range:
RCCS30LR - 38: 0.3 kg/l to 5 kg/l
RCCx39 -39/XR : 0.3 kg/l to 2 kg/l
No density measurement for gas application.
With option /K4 thermal stabilized.
For option /K6 see also “Special calibrations” on page 3.

Table 4: Accuracy (at calibration conditions):

Type	Standard	Option /K4	Option /K6
RCCS30LR	0.02 g/cm³ *)	------	------
RCCS30	0.008 g/cm³ *)	------	------
RCCS31	0.004 g/cm³	0.001 g/cm³	------
RCCS32	0.004 g/cm³	0.001 g/cm³	0.0005 g/cm³
RCCS33	0.004 g/cm³	0.001 g/cm³	0.0005 g/cm³
RCCx34	0.003 g/cm³	0.001 g/cm³	0.0005 g/cm³
RCCx36	0.0022 g/cm³	0.001 g/cm³	0.0005 g/cm³
RCCx38	0.0015 g/cm³	0.001 g/cm³	0.0005 g/cm³
RCCx39	0.0015 g/cm³	0.001 g/cm³	0.0005 g/cm³
RCCx39//IR	0.0015 g/cm³	------	------
RCCx39//XR	0.0015 g/cm³	------	------

*) 0.003 g/cm³ on request

Repeatability:
RCCS32-33, RCCx34-39/XR : ± 0.0005 g/cm³ (Std, /K4)
Static pressure effect:
Compensated if static pressure is set in the menu

Specification of high performance density measurement option /K6: Density calibration

Density range : 0.3 to 2.5 kg/l
Ambient temp. range : -10°C to 50°C
Fluid temp. range : -50°C to 150°C (not /HT)
150°C to 350°C (/HT)
Minimum flow rate for specified accuracy:
- RCCx36 to RCCx39 : 700 kg/h
- RCCx34 : 140 kg/h
- RCCS33 : 90 kg/h
- RCCS32 : 37 kg/h

Maximum flow rate : Qnom
Repeatability : ±0.0002 g/cm³
Temperature measurement:
$\pm(0.5°C+0.002*abs(T_{medium}-20°C))$ (not /HT)
$\pm(0.5°C+0.008*abs(T_{medium}-20°C))$ (/HT)
Density accuracy : for one phase liquids only
Process temperature influence :
$0.000015\ g/cm^3 * abs(T_{fluid}-20°C)$

Temperature Measurement
Temperature measuring range of converter :
Standard, /LT, /MT : -200°C to 230°C
Option /HT : 0°C to 350°C
Accuracy:
Standard (-70°C to 150°C) : ±(0.5°C+0.005*abs(T_{medium}-20°C))
Option /MT (-70°C to 230°C) : ±(0.5°C+0.005*abs(T_{medium}-20°C))
Option /LT (-200°C to 150°C): ±(1.0°C+0.008*abs(T_{medium}-20°C))
Option /HT (0°C to 350°C) : ±(1.0°C+0.008*abs(T_{medium}-20°C))
For process temperatures more than 80°C higher/lower than ambient temperature the detector should be insulated to maintain optimum accuracy.

Heat Tracing
Heating with heat carrier, insulation and protection housing. The max. surface temperature at the protection housing from inner heating is 40°C. Above 150°C process temperature insulation from the manufacturer is recommended. However up to 230°C process temperature the customer can insulate the detector themselves.
Option /T1 : only insulation and protection
Option /T2 : insulation, protection and heating line
Option /T3 : like /T2 but with ventilation
Process connection for the heat carrier fluid (see table 10):
for D-type flanges : EN DN 15 PN 40 Form B1
for A-type flanges : ANSI ½ - 150 lbs.
for J-type flanges : JIS DN15 10K
Max. pressure : PN 40
Protection class : IP54, install roof protected
For fluid temperatures below -70°C select option /LT.

Calibration for liquids and gases :
The ROTAMASS flowmeters are always factory calibrated with water. Calibration Conditions:
- Water : 22.5°C ± 12.5°C
- Ambient temperature : 22.5°C ± 12.5°C
- Process Pressure : 1 to 2 bar abs
- Installation: RCCS30LR to RCCS/T38 vertical
  RCCS/T39 to RCCS/T39/XR horizontal

All specifications are based on above mentioned calibration reference conditions, a flow calibration protocol is attached to each instrument.

Special calibrations
- Mass-/Volume flow calibration with factory certificate (option /K2): Calibration with water at customer specified flow values according calibration order sheet.
- Mass-/Volume flow calibration with DKD/DAkkS certificate EN17025 (option /K5): Calibration with water at customer specified flow values according calibration order sheet.
- Density calibration with factory certificate (option /K6): Adjustment and check with 3 different fluids, fluid temperature influence adjustment for low ambient temperature influence and thermal treatment for long term density measurement stability, enhanced temperature measurement (see also page 11).

Dual Seal approval (option /DS):
- Conform with ANSI/ISA-12.27.01.
- Only for use with hazardous substances.
- Up to ANSI class 900 line pressure.
- Only with FM approval option.
- For liquid application the leakage detection is realized by software in the converter.
- For gas application options /GA and /RD (rupture disk) are mandatory.
- Rupture disk is only for annunciation.

NORMAL OPERATING CONDITIONS

Ambient Temperature Limits
- Remote detector RCCS3 :
  Standard : -50°C to +80°C
  Option /LT : -50°C to +80°C
  Option /MT : -50°C to +80°C
  Option /HT : -50°C to +65°C
  (up to 280°C medium temperature)
  -50°C to +55°C
  (up to 350°C medium temperature)
  Terminal box temperature should not exceed 100°C
- Remote converter RCCF31, RCCR31 and Integral type RCCT3:
  Display operating range : -20°C to +55°C)
  Electronic operating range : -40°C to +55°C
  Cold start : above -30°C

Where meters are mounted in direct sunlight, it is recommended to install a sunshade. This is particularly important in countries with high ambient temperatures.

Ambient Humidity Limits : 0 to 95% RH

Process Temperature Limits

Detector :
- RCCS30LR to 33 : -50°C to 150°C
- RCCS34 to 39/XR : -70°C to 150°C
- RCCS34 to 39/XR /MT : -70°C to 230°C
  (Range 150°C - 230°C recommended with /Tx option)
- RCCS34 to 39/XR /LT : -200°C to 150°C
- RCCS34 to 39/IR /HT : 0°C to 350°C (only with /Tx option or with /S2 and customer insulation)
- RCCS39/XR /HT : 0°C to 350°C (only with /S2 and customer insulation)

Integral type :
- RCCT34 to 39/XR : -50°C to 150°C

For use in hazardous area see “Hazardous Area Specifications”

Heat Carrier Fluid Temperature Limits
(Option /T2 or /T3 only for remote type RCCS30LR to 39/IR)
- Standard : 0°C to 150°C
- With option /LT : -200°C to 150°C
- With option /MT : 0°C to 230°C
- With option /HT : 0°C to 350°C

For fluid temperatures below -70°C select option /LT.

Process Pressure Limit
In dependance of the process connections s. table 9.
On request following maximum pressure up to 27°C (RT=Room Temp.):

Material wetted parts	SH [bar]	SL [bar]	HC [bar]
RCCS30LR	400	----	----
RCCS30	400	----	----
RCCS31	350	----	----
RCCS32	285	----	----
RCCS33	285	----	----
RCCS34 / RCCT34	----	260	385
RCCS36 / RCCT36	----	210	315
RCCS38 / RCCT38	----	175	260
RCCS39 / RCCT39	----	135	260
RCCS39/IR / RCCT39/IR	----	110	180
RCCS39/XR / RCCT39/XR	----	95	----

For higher medium temperatures maximum tube pressure needs to be derated as follows :

up to 50°C	: 4% derating
51 to 100°C	: 11% derating
101 to 150°C	: 20% derating
151 to 230°C	: 30% derating
231 to 350°C	: 38% derating

Higher pressure on request.
The maximum process pressure of a single instrument is given by the lower value either of the process connections (table 9) or tubes. The maximum temperature and process pressure limits of an instrument are marked on the name plate as TS and PS.
The given temperature/pressure ranges are calculated and approved without corrosion or erosion effects. The customer is fully responsible to select proper materials to withstand his corrosive or erosive conditions. In case of heavy corrosion and/or erosion the instrument may not withstand the pressure and an incident may happen with human and/or environmental harm. Yokogawa will not take any liability regarding damage caused by corrosion / erosion. If corrosion/erosion may happen, the user has to check periodically if the necessary wall thickness is still in place.

Gas Content Limits for Liquid/Gas Mixtures
Gas content limit is defined as the amount of gas in a liquid/gas mixture which generates an error in the converter. The gas content limit is dependent on viscosity,
surface tension and bubble size of the liquid/gas mixture. Furthermore it is highly flow rate dependent (the higher the flow rate, the lower the gas content limits). The stated values are for a flow of 50% of Q_{nom} and water/air without /HP:

Model	Gas fraction
- RCCS30LR to RCCS32	: no limitation
- RCCS33 non-Ex type	: no limitation
- RCCS33 Ex type	: approx. 35%
- RCCx34	: no limitation
- RCCx36	: approx. 50%
- RCCx38	: approx. 30%
- RCCx39	: approx. 7%
- RCCx39/IR	: approx. 3%
- RCCx39/XR (with /HP)	: approx. 2%

With option /HP the gas content limits are improved.
With liquid/gas mixtures the specified mass flow accuracy will not be achieved.
For short time aeration a function can be activated to keep the current outputs constant during the aeration time.

Other 2 Phase Flow, liquid/solid and liquid/liquid
Two phase flow can generate minus span errors. The errors are proportional to the difference in density between the 2 phases and the amount of the second phase. If the particles or droplets are very small no errors will be generated.

Secondary Containment

Model	Typical rupture pressure	Option /J1 pressure test *)
RCCS30LR-33	65 bar	---
RCCx34-36	120bar	60 bar
RCCx38	120 bar	40 bar
RCCx39-39/IR	80 bar	10 bar
RCCx39/XR	on request	---
RCCx39/XR/HT	50 bar	---

*) Pressure test with safety factor S=1.1
However if the detector housing is exposed to this pressure it will deform and measurement will be strongly influenced. Therefore the pressure test of the housing (option /J1) can only be done as shown in above table.

Power Supply and Power Consumption
- AC-/DC-type : For details see “Electrical Specifications”

MECHANICAL SPECIFICATIONS

Protection Class
- RCCT3x : IP66/67
- RCCF31 : IP66/67
- RCCS3x : IP66/67
- RCCR31 : IP20

Materials
- Detector housing : Stainless steel 304/1.4301
- Detector terminal box : 316L/1.4404
- Detector gas filling plug: 1.4305
- Detector insulation housing : Stainless steel 304/1.4301
- Detector rupture disk (/RD) : 316L
- Field- mount converter housing : Aluminium alloy with Polyurethane corrosion-resistant coating or epoxy coating (option /X1)
- Field- mount converter mounting bracket: : Stainless steel 304/1.4301
- Rack- mount converter housing : Aluminium

Coating Color
- Field-mount converter case : Mint green

Wetted Parts
- RCCS30LR to 33 :
  Measuring tubes : Ni-Alloy C-22/2.4602
  Process connections : 316L/1.4404
- RCCx34 to 39/IR :
  Measuring tubes and process connection : 316L/1.4404/1.4435 or
  Measuring tubes and flange face : Ni-Alloy C-22/2.4602
- RCCx39/XR :
  Measuring tubes and process connection : 316L/1.4404/1.4435

Table 5 : Diameter of measuring tubes

Type		RCCS30 LR	RCCS30	RCCS31	RCCS32	RCCS33
Inner diameter	mm	0.9	1.2	2.1	3	4.5
Wall thickness	mm	0.15	0.2	0.25	0.25	0.4

Type		RCCx34	RCCx36	RCCx38	RCCx39	RCCx39 /IR	RCCx39 /XR
Inner diameter	mm	7.7	13.4	22.1	37.2	54.5	82.50
Wall thickness	mm	0.89	1.24	1.65	2.6	2.9	3.2

Pressure Equipment Directive 97/23/EC
RCCS30LR- RCCS33 : SEP
FLUID GROUP 1 : MODULE H, CATEGORY III
FLUID GROUP 2 : RCCX34-RCCX38: SEP
: RCCX39-RCCS39/XR: CAT.I

For all Process Connections : CRN 0F12074.5

Vibration Test : Acc. IEC 60068-2-64

■ELECTRICAL SPECIFICATIONS

Power Supply
- AC- type : 90 V to 264 V AC
- AC- Ex-type : 90 V to 250 V AC
- DC- type : 20.5 V to 28.8 V DC

Power consumption : max. 25 VA / 10 W
External circuit breaker rating : 5 A, 250 V (In the converter no power switch is installed).

Fuse on Base Board
- AC- type : 2 A, T, breaking capacity 1500A
- DC- type : 2 A, T, breaking capacity 1500A

I/O Signals
- Two active current outputs: Iout1, Iout2
  4 to 20 mA DC, galvanic separated from other signals,
  Load resistance : 20 Ω to 600 Ω
  Failure current according NAMUR NE43
  Ambient temperature effect : < 0.05% of span/10°C
  Linearity : 0.008 mA = 0.05% of span
  Setting range URV for liquids: 5 to 100% of Q_{max}
  Setting range URV for gases: 1 to 100% of Q_{max}
- Two pulse outputs / status outputs : Pout, Sout
  Passive transistor contact output, 30 V DC, 200 mA
  Output rate
  Output 1 : 0 to 10000 pulses/s
  Output 2 : 0 to 2000 pulses/s
  Option /NM : passive, according EN 60947-5-6
  Option /AP : active output, 12 V, 6 mA, R_L > 10 kΩ
  Active pulse output is not isolated from current output 2
  As frequency output
  Output 1 : 20 Hz to 10000 Hz
  Output 2 : 20 Hz to 2000 Hz
- Status input : Voltage-free contact
  Closed : < 200 Ω
  Open : > 100 kΩ

Option /KF2, /EF2, /UF2: 2 intrinsic safe outputs
- One passive current output (additional power supply needed) : Iout
  4 to 20 mA DC, galvanic separated from other signals.
  Supply voltage 10.5 V to 30 V DC (without HART®), 165 mA
  Supply voltage 16.75 V to 30 V DC (with HART®), 165 mA
  Load resistance : 20 Ω ... 600 Ω
  Ambient temperature effect : < 0.05% of span/10°C
- One pulse output / status output : Pout
  Passive transistor contact output, 30 V DC, 100 mA
  Output rate : 0 to 2000 pulses/s
  As frequency output : 20 Hz to 2000 Hz
  Option /NM : passive, according EN 60947-5-6
- No status input

Digital Communication
- HART® communication protocol rev. 5, superimposed on 4 -20 mA DC signal (Iout1)
  - Load resistance : 230 Ω to 600 Ω (including cable)
  - Power line spacing : >15 cm, avoid parallel wiring
  - Cable length : ≤ 2 km if „CEV" cables are used
- FOUNDATION™ Fieldbus communication (/FB)
  - see GS 01R04B05-00E
- MODBUS® communication (/MB1)
  - Physical interface RS485 as two wire data bus according EIA/TIA-485
  - Maximal bus length is depending from bus topology and communication speed.
  - Addresses: 1 to 247
  - Baud rates: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 76800, 115200
  - Data formats: E/1, O/1, N/1, N/2 (parity/stop bits)
  - Modes: RTU, ASCII

Setting Functions
Parameter setting is possible by using the infrared switches on the display or with HART® communication. For comfortable setting we recommend to use Yokogawas Filedmate setting tool (DTM based).

Display Function
- Up to 4 lines.
- 4 languages selectable (English, German, French, Russian)

Damping Functions
Adjustable from 0 seconds to 200 seconds, controls display and outputs.

Isolation Resistance of Converter
When surge arrestors are removed
- between power and ground terminal: >100 MΩ / 500 V DC
- between power and I/O terminals : >20 MΩ / 100 V DC
- between I/O terminals and ground : >20 MΩ / 100 V DC

Dielectric Strength
When surge arrestors are removed
- between power and ground terminal : 1,500 V AC for 1 minute

Lightning Protection
Arresters 2000 A are inside of the converter for power supply lines.

Electromagnetic Compatibility
Acc. EN 61326-1: 2006, Class A, Table 2
EN 61326-2-3: 2006
EN 61000-3-2: 2006
EN 61000-3-3: 2008

Safety Requirement Standards
Acc. EN 60010-1: 2001
Overvoltage category II
Pollution degree 2

■REMOTE CABLE RCCY03 SPECIFICATION

Li2Y(St)/CY 3x2 AWG24 + 1x3 AWG20, pair/triple shielded; pair/triple twisted; overall shielding
RCCY033/034 and RCCY031/032/KS1: flame propagation acc. IEC 60332-1.
or 3 x Coax + 1x3 AWG20, shielded, twisted; overall shielding; flame propagation acc. IEC 60332-1.
Table 6 : Cable specifications

Model code	Temperature range	Wire gauge	Resistance of loop	Capacitance wire/wire	Capacitance wire/shield	Inductance wire/wire
RCCY031/032	-50 to +70°C	AWG 24 AWG 20	190 Ω/km 70 Ω/km	157 nF/km 193 nF/km	249 nF/km 290 nF/km	0.60 mH/km 0.65 mH/km
RCCY031/032 /KS1 **RCCY031/032 /NS1**	-50 to +70°C	AWG 24 AWG 20	190 Ω/km 70 Ω/km	157 nF/km 193 nF/km	249 nF/km 290 nF/km	0.60 mH/km 0.65 mH/km
RCCY033/034	-30 to +105°C	AWG 24 AWG 20	177 Ω/km 70 Ω/km	175 nF/km 145 nF/km	350 nF/km 290 nF/km	0.80 mH/km 0.70 mH/km
RCCY033/034 /KS1 **RCCY033/034 /NS1**	-30 to +105°C	AWG 24 AWG 20	177 Ω/km 70 Ω/km	175 nF/km 145 nF/km	350 nF/km 290 nF/km	0.80 mH/km 0.70 mH/km
RCCY03x with coax	-50 to +105°C	Coax AWG 20	37 Ω/km 70 Ω/km	120 nF/km 145 nF/km	132 nF/km 290 nF/km	0.175 mH/km 0.70 mH/km

HAZARDOUS AREA SPECIFICATIONS

ATEX

Remote Detector RCCS30LR ... 39/XR (Option /KS1):

- KEMA 01ATEX 1075 X
- Intrinsically safe
- II 2G Ex ib IIB/IIC T1 ... T6 Gb
- II 2D Ex ib IIIC Txxx Db
  (xxx = max. surface temperature see below)
- Max. surface temperature :
  Standard + /LT : 150°C
  /MT : 220°C
  /HT : 350°C
- Degree of protection : IP67
- Ambient humidity : 0 to 95% RH
- Ambient temperature range
  Standard , option /LT and option /MT
  : -50°C to +80°C
  Option /HT (process temperature < 280°C
  : -50°C to +65°C
  Option /HT (process temperature < 350°C
  : -50°C to +55°C
- Process temperature limits :
  Standard : -50°C to 150°C
  Option /LT: : -200°C to 150°C
  Option /MT: : -50°C to 220°C
  Option /HT : 0°C to 350°C
- Heat carrier fluid temperature limits
  Standard : -50°C to 150°C
  Option /MT: : -50°C to 220°C
  Option /HT : 0°C to 350°C

Remote Converter RCCF31 (Option /KF1) :

- KEMA 02ATEX 2183 X
- Flame proof with intrinsic safe connection to detector (ib)
- II 2G Ex d(e) [ib] IIC T6
- II 2G Ex d(e) [ib] IIB T6 with option /HP
- II 2D Ex tD [ibD] A21 IP6x T75°C
- Max. surface temperature : 75°C
- Degree of protection : IP67
- Power supply : 90 to 250 V AC, 50/60 Hz or
  20.5 to 28.8 V DC
- Power consumption : max. 25 VA / 10 W
- Ambient humidity : 0 to 95% RH
- Ambient temperature range : -40°C to +55°C

Remote Converter RCCF31 (Option /KF2) :

- KEMA 02ATEX 2183 X
- Flame proof with intrinsic safe connection to detector (ib)
- Additional intrinsic safe outputs.
- II 2G Ex d(e) [ia] [ib] IIC T6
- II 2G Ex d(e) [ia] [ib] IIB T6 with option /HP
  Protection [ia] refers to the intrinsic safe outputs.
  Protection [ib] refers to the connection to the detector.
- II 2D Ex tD [ibD] A21 IP6x T75°C
- Max. surface temperature : 75°C
- Degree of protection : IP67
- Power supply : 90 to 250 V AC, 50/60 Hz or
  20.5 to 28.8 V DC
- Power consumption : max. 25VA / 10W
- Ambient humidity : 0 to 95% RH
- Ambient temperature range : -40°C to +55°C

Remote Converter RCCR31 (Option /KS1) :

- KEMA 02ATEX 2183 X
- Associated apparatus with intrinsic safe connection to detector (ib)
- II (2)G [Ex ib] IIC
- II (2)G [Ex ib] IIB with option /HP
- II (2)D [Ex ibD]
- Power supply : 90 to 250 V AC, 50/60 Hz or
  20.5 to 28.8 V DC
- Power consumption : max. 25 VA / 10 W
- Ambient humidity : 0 to 95% RH
- Ambient temperature range : -40°C to +55°C

WARNING

Remote rack-mount converter RCCR31 must be installed in safe area !

Integral Type RCCT34 ... 39/XR (Option /KF1) :

- KEMA 02ATEX 2183 X
- Flame proof with intrinsic safe connection to detector (ib)
- II 2G Ex d(e) [ib] IIC T6 ... T3
- II 2G Ex d(e) [ib] IIB T6 ... T3 with option /HP
- II 2D Ex tD A21 IP6x T150°C
- Max. surface temperature : 150°C
- Degree of protection : IP67
- Power supply : 90 to 250V AC, 50/60 Hz or
  20.5 to 28.8 V DC
- Power consumption : max. 25V A / 10 W
- Ambient humidity : 0 to 95% RH
- Ambient temperature range : -40°C to +55°C

Integral Type RCCT34 ... 39/XR (option /KF2) :

- KEMA 02ATEX 2183 O
- Flame proof with intrinsic safe connection to detector (ib)
- Additional intrinsic safe outputs.
- II 2G Ex d(e) [ia] [ib] IIC T6 ... T3
- II 2G Ex d(e) [ia] [ib] IIB T6 ... T3 with option /HP
  Protection [ia] refers to the intrinsic safe outputs.
  Protection [ib] refers to the connection to the detector.
- II 2D Ex tD A21 IP6x T150°C
- Max. surface temperature : 150°C
- Degree of protection : IP67
- Power supply : 90 to 250V AC, 50/60 Hz or
  20.5 to 28.8V DC
- Power consumption : max. 25 VA / 10 W
- Ambient humidity : 0 to 95% RH
- Ambient temperature range : -40°C to +55°C

Electrical Data Remote Detector RCCS30LR ... 33 :

- Driving circuit : terminals D+ and D
  Ex ib IIC : Ui = 16 V; Ii = 53 mA; Pi = 0.212 W
  Li = 4.2 mH; Ci = negligible small
  Ex ib IIB : Ui = 16 V; Ii = 153 mA; Pi = 0.612 W
  Li = 4.2 mH; Ci = negligible small
- Sensor circuits: terminals S1+ and S1- or S2+ and S2-
  Ex ib IIC : Ui = 16 V; Ii = 80 mA; Pi = 0.32 W
  Li = 4.2 mH; Ci = negligible small
- Temperature sensor circuit : terminals TP1, TP2, TP3
  Ex ib IIC : Ui = 16 V; Ii = 50 mA; Pi = 0.2 W
  Li = negligible small; Ci = negligible small

Electrical Data Remote Detector RCCS34 ... 39/XR :

- Driving circuit : terminals D+ and D
  Ex ib IIC : Ui = 16 V; Ii = 53 mA; Pi = 0.212 W
  Li = 3.2 mH; Ci = negligible small
  Ex ib IIB : Ui = 16 V; Ii = 153 mA; Pi = 0.612 W
  Li = 3.2 mH; Ci = negligible small
- Sensor circuits: terminals S1+ and S1- or S2+ and S2-
  Ex ib IIC : Ui = 16 V; Ii = 80 mA; Pi = 0.32 W
  Li = 2.1 mH; Ci = negligible small
- Temperature sensor circuit : terminals TP1, TP2, TP3
  Ex ib IIC : Ui = 16 V; Ii = 50 mA; Pi = 0.2 W
  Li = negligible small; Ci = negligible small

Electrical Data Remote Converter RCCF31, RCCR31 and Converter of Intergral Type RCCT3 :

- Driving circuit : terminals D+ / D-
  Ex [ib] IIC : Uo = 14.5 V; Io = 47 mA; Po = 0.171 W
  Lo = 15 mH; Co = 0.65 µF
  Ex [ib] IIB : Uo = 11.7 V; Io = 124 mA; Po = 0.363 W
  Lo = 8 mH; Co = 10.3 µF
- Sensor circuits: terminals S1+/ S1- or S2+ / S2-
  Ex [ib] IIB/IIC : Uo = 14.5 V; Io = 47 mA; Po = 0.171 W
  Ex [ib] IIC : Lo = 15 mH; Co = 0.65 µF
  Ex [ib] IIB : Lo = 60 mH; Co = 4.07 µF

- Temperature sensor circuit : terminals TP1, TP2, TP3
  Ex [ib] IIB/IIC : Uo = 13.3 V; Io = 40 mA; Po = 0.133 W
  Ex [ib] IIC : Lo = 20 mH; Co = 0.91 µF
  Ex [ib] IIB : Lo = 80 mH; Co = 5.6 µF
- Current output (only option /KF2) :
  Ex [ia] IIC : Ui = 30 V; Ii = 165 mA; Pi = 1.25 W
  Li = negligible small; Ci = 6.9 nF
- Pulse output (only option /KF2) :
  Ex [ia] IIC : Ui = 30 V; Ii = 100 mA; Pi = 0.75 W
  Li = negligible small; Ci = 4.5 nF

Temperature classification see table 7.

FM (For USA and Canada)

Remote Detector RCCS30LR ... 39/XR (Option /FS1) :
- Intrinsically safe
- AEx ia IIC, Class 1, Zone 0
- IS Class I, Division 1, Groups A, B, C, D T6
- DIP Class II / III, Division 1, Groups E, F, G
- IP67 / NEMA 4X
- Ambient temperature range : -50°C to +80°C / -58°F to 176°F

Remote Converter RCCF31 (Option /FF1) :
- Housing explosion proof
- Provides intrinsically safe detector circuits
- AEx d [ia] IIC, Class I, Zone 1, T6
- AEx d [ia] IIB, Class I, Zone 1, T6 with option /HP
- Class I, Division 1, Groups A, B, C, D
- Class I, Division 1, Groups C, D with option /HP
- Class II / III, Division 1, Groups E, F, G
- AIS Class I / II / III, Division 1, Groups A, B, C, D, E, F, G
- AIS Class I / II / III, Division 1, Groups C, D, E, F, G with /HP
- IP67 / NEMA 4X
- Ambient temperature range : -40°C to +50°C / -40°F to 122°F

Remote Converter RCCR31 (Option /FS1) :
- Intrinsic safe associated apparatus
- Provides intrinsically safe detector circuits
- [AEx ia] IIC, Class I, Zone 1
- [AEx ia] IIB, Class I, Zone 1, T6 with option /HP
- AIS Class I, Division 1, Groups A, B, C, D
- AIS Class I, Division 1, Groups C, D with option /HP
- Ambient temperature range : -40°C to +50°C / -40°F to 122°F

Integral Type RCCT34 ... 39/XR (Option /FF1) :
- Housing explosion proof
- AEx d [ia] IIC, Class I, Zone 1, T6
- AEx d [ia] IIB, Class I, Zone 1, T6 with option /HP
- Class I, Division 1, Groups A, B, C, D
- Class I, Division 1, Groups C, D with option /HP
- Class II / III, Division 1, Groups E, F, G
- IP67 / NEMA 4X
- Ambient temperature range : -40°C to +50°C / -40°F to 122°F

Process Temperature Limits :
- Standard : -50°C to 150°C / -58°F to 302°F
- with option /LT : -200°C to 150°C / -328°F to 302°F
- with option /MT : -50°C to 220°C / -58°F to 428°F
- with option /HT : 0°C to 350°C / 32°F to 662°F

Heat Carrier Fluid Temperature Limits :
- Standard : -50°C to 150°C / -58°F to 302°F
- with option /MT : -50°C to 220°C / -58°F to 428°F
- with option /HT : 0°C to 350°C / 32°F to 662°F

Electrical Data Remote Converter RCCF31, RCCR31 and Converter of Intergral Type RCCT3 :
- Driving circuit : terminals D+ / D-
  Uo = 14.5 V; Io = 47 mA; Po = 0.171 W
  Lo = 15 mH; Co = 0.65 µF
- Driving circuit : terminals D+ / D- with option /HP
  Uo = 11.7 V; Io = 124 mA; Po = 0.363 W
  Lo = 8 mH; Co = 10.3 µF
- Sensor circuits: terminals S1+/ S1- or S2+ / S2-
  Uo = 14.5 V; Io = 47 mA; Po = 0.363 W
  Lo = 15 mH; Co = 0.65 µF
- Temperature sensor circuit : terminals TP1, TP2, TP3
  Uo = 13.3 V; Io = 40 mA; Po = 0.133 W
  Lo = 20 mH; Co = 0.91 µF

Electrical Data Remote Detector RCCS30LR ... 33 :
- Driving circuit : terminals D+ and D
  Groups A-D: Ui = 16 V; Ii = 53 mA; Pi = 0.212 W
  Li = 4.2 mH; Ci = negligible small
  Groups C,D: Ui = 16 V; Ii = 153 mA; Pi = 0.612 W
  Li = 4.2 mH; Ci = negligible small
- Sensor circuits: terminals S1+ and S1- or S2+ and S2-
  Ui = 16 V; Ii = 80 mA; Pi = 0.32 W
  Li = 4.2 mH;Ci = negligible small
- Temperature sensor circuit : terminals TP1, TP2, TP3
  Ui = 16 V; Ii = 50 mA; Pi = 0.2 W
  Li = negligible small; Ci = negligible small

Electrical Data Remote Detector RCCS34 ... 39/XR :
- Driving circuit : terminals D+ and D
  Groups A-D: Ui = 16 V; Ii = 53 mA; Pi = 0.212 W
  Li = 3.2mH; Ci = negligible small
  Groups C,D: Ui = 16 V; Ii = 153 mA; Pi = 0.612 W
  Li = 3.2mH; Ci = negligible small
- Sensor circuits: terminals S1+ and S1- or S2+ and S2-
  Ui = 16 V; Ii = 80 mA; Pi = 0.32 W
  Li = 2.1 mH;Ci = negligible small
- Temperature sensor circuit : terminals TP1, TP2, TP3
  Ui = 16 V; Ii = 50 mA; Pi = 0.2 W
  Li = negligible small; Ci = negligible small

The remote converter RCCF31 has a T6 temperature class rating for operation at ambient temperature up to +50°C / +122°F.

Special conditions :
- ROTAMASS with FM approval is only available with ANSI 1/2" NPT cable conduit connection "A".
- The flowmeter must be connected to the potential equalization system.
- For AC-version maximum power supply is 250V AC.
- For remote type the maximum cable length is 50m / 164ft.
- For remote type at ambient temperature up to 50°C / 122°F use remote cable RCCY031 or RCCY032.
- For remote type at ambient temperature from 50°C / 122°F up to 80°C / 176°F use remote cable RCCY033 or RCCY034.
- Use conduit seals within 18 inches for power supply- and IO- cable entries at RCCT3 / RCCF31.

Temperature classification see table 7.

IECEx APPROVAL

Certificate: IECEx KEM 06.0031X

Remote Detector RCCS30LR ... 39/XR (Option /ES1):

- Intrinsically safe
- Ex ib IIB/IIC T1 ... T6 Gb
- Standard + /LT : Ex ib IIIC T150°C Db
  Option /MT : Ex ib IIIC T220°C Db
  Option /HT : Ex ib IIIC T350°C Db
- Max. surface temperature :
  Standard + /LT : 150°C
  /MT : 220°C
  /HT : 350°C
- Degree of protection : IP67
- Ambient humidity : 0 to 95% RH
- Ambient temperature range
  Standard, option /LT and option /MT
  : -50°C to +80°C
  Option /HT (process temperature < 280°C
  : -50°C to +65°C
  Option /HT (process temperature < 350°C
  : -50°C to +55°C
- Process temperature limits :
  Standard : -50°C to 150°C
  Option /LT: : -200°C to 150°C
  Option /MT: : -50°C to 220°C
  Option /HT : 0°C to 350°C
- Heat carrier fluid temperature limits :
  Standard : -50°C to 150°C
  Option /MT: : -50°C to 220°C
  Option /HT : 0°C to 350°C

Remote Converter RCCF31 (Option /EF1) :

- Explosion proof with intrinsic safe connection to detector (ib)
- II 2G Ex d(e) [ib] IIC T6
- II 2G Ex d(e) [ib] IIB T6 with option /HP
- II 2D Ex tD [ibD] A21 IP6x T75°C
- Max. surface temperature : 75°C
- Degree of protection : IP67
- Power supply : 90 to 250 V AC, 50/60 Hz or
  20.5 to 28.8 V DC
- Power consumption : max. 25 VA / 10 W
- Ambient humidity : 0 to 95% RH
- Ambient temperature range : -40°C to +55°C

Remote Converter RCCF31 (Option /EF2) :

- Explosion proof with intrinsic safe connection to detector (ib)
- Additional intrinsic safe outputs.
- II 2G Ex d(e) [ia] [ib] IIC T6
- II 2G Ex d(e) [ia] [ib] IIB T6 with option /HP
  Protection [ia] refers to the intrinsic safe outputs.
  Protection [ib] refers to the connection to the detector.
- II 2D Ex tD [ibD] A21 IP6x T75°C
- Max. surface temperature : 75°C
- Degree of protection : IP67
- Power supply : 90 to 250 V AC, 50/60 Hz or
  20.5 to 28.8 V DC
- Power consumption : max. 25 VA / 10 W
- Ambient humidity : 0 to 95% RH
- Ambient temperature range : -40°C to +55°C

Remote Converter RCCR31 (Option /ES1) :

- Associated apparatus with intrinsic safe connection to detector (ib)
- II (2)G [Ex ib] IIC
- II (2)G [Ex ib] IIB with option /HP
- II (2)D [Ex ibD]
- Power supply : 90 to 250 V AC, 50/60 Hz or
  20.5 to 28.8 V DC
- Power consumption : max. 25 VA / 10 W
- Ambient humidity : 0 to 95% RH
- Ambient temperature range : -40°C to +55°C

WARNING

Remote rack-mount converter RCCR31 must be installed in safe area !

Integral Type RCCT34 ... 39/XR (Option /EF1) :

- Explosion proof with intrinsic safe connection to detector (ib)
- II 2G Ex d(e) [ib] IIC T6 ... T3
- II 2G Ex d(e) [ib] IIB T6 ... T3 with option /HP
- II 2D Ex tD A21 IP6x T150°C
- Max. surface temperature : 150°C
- Degree of protection : IP67
- Power supply : 90 to 250 V AC, 50/60 Hz or
  20.5 to 28.8 V DC
- Power consumption : max. 25 VA / 10 W
- Ambient humidity : 0 to 95% RH
- Ambient temperature range : -40°C to +55°C

Integral Type RCCT34 ... 39/XR (Option /EF2) :

- Flame proof with intrinsic safe connection to detector (ib)
- Additional intrinsic safe outputs.
- II 2G Ex d(e) [ia] [ib] IIC T6 ... T3
- II 2G Ex d(e) [ia] [ib] IIB T6 ... T3 with option /HP
  Protection [ia] refers to the intrinsic safe outputs.
  Protection [ib] refers to the connection to the detector.
- II 2D Ex tD A21 IP6x T150°C
- Max. surface temperature : 150°C
- Degree of protection : IP67
- Power supply : 90 to 250 V AC, 50/60 Hz or
  20.5 to 28.8 V DC
- Power consumption : max. 25 VA / 10 W
- Ambient humidity : 0 to 95% RH
- Ambient temperature range : -40°C to +55°C

Electrical Data Remote Converter RCCF31, RCCR31 and Converter of Integral Type RCCT3 :

- Driving circuit : terminals D+ / D-
  Ex [ib] IIC : Uo = 14.5 V; Io = 47 mA; Po = 0.171 W
  Lo = 15 mH; Co = 0.65 µF
  Ex [ib] IIB : Uo = 11.7 V; Io = 124 mA; Po = 0.363 W
  Lo = 8 mH; Co = 10.3 µF
- Sensor circuits: terminals S1+/ S1- or S2+ / S2-
  Ex [ib] IIB/IIC : Uo = 14.5 V; Io = 47 mA; Po = 0.171 W
  Ex [ib] IIC : Lo = 15 mH; Co = 0.65 µF
  Ex [ib] IIB : Lo = 60 mH; Co = 4.07 µF
- Temperature sensor circuit : terminals TP1, TP2, TP3
  Ex [ib] IIB/IIC : Uo = 13.3 V; Io = 40 mA; Po = 0.133 W
  Ex [ib] IIC : Lo = 20 mH; Co = 0.91 µF
  Ex [ib] IIB : Lo = 80 mH; Co = 5.6 µF
- Current output (only option /EF2) :
  Ex [ia] IIC : Ui = 30 V; Ii = 165 mA; Pi = 1.25 W
  Li = negligible small; Ci = 6.9 nF
- Pulse output (only option /EF2) :
  Ex [ia] IIC : Ui = 30 V; Ii = 100 mA; Pi = 0.75 W
  Li = negligible small; Ci = 4.5 nF

Electrical Data Remote Detector RCCS30LR ... 33:

- Driving circuit : terminals D+ / D-
  Ex ib IIC : Ui = 16 V; Ii = 53 mA; Pi = 0.212 W
  Li = 4.2 mH; Ci = negligible small
  Ex ib IIB : Ui = 16 V; Ii = 153 mA; Pi = 0.612 W
  Li = 4.2 mH; Ci = negligible small
- Sensor circuits: terminals S1+/ S1- or S2+ / S2-
  Ex ib IIC : Ui = 16 V; Ii = 80 mA; Pi = 0.32 W
  Li = 4.2 mH; Ci = negligible small
- Temperature sensor circuit : terminals TP1, TP2, TP3
  Ex ib IIC : Ui = 16 V; Ii = 50 mA; Pi = 0.2 W
  Li = negligible small;
  Ci = negligible small

Electrical Data Remote Detector RCCS34 ... 39/XR :

- Driving circuit : terminals D+ / D
  Ex ib IIC : Ui = 16 V; Ii = 53 mA; Pi = 0.212 W
  Li = 3.2 mH; Ci = negligible small
  Ex ib IIB : Ui = 16 V; Ii = 153 mA; Pi = 0.612 W
  Li = 3.2 mH; Ci = negligible small
- Sensor circuits: terminals S1+/ S1- or S2+ / S2-
  Ex ib IIC : Ui = 16 V; Ii = 80 mA; Pi = 0.32 W
  Li = 2.1 mH; Ci = negligible small
- Temperature sensor circuit : terminals TP1, TP2, TP3
  Ex ib IIC : Ui = 16 V; Ii = 50 mA; Pi = 0.2 W
  Li = negligible small;
  Ci = negligible small

Temperature classification see table 7.

Table 7 : Temperature classification for ATEX, FM, IECEx, INMETRO, NEPSI and KOSHA certified flowmeter

	RCCS30LR to RCCS33 without insulation		RCCS30LR to RCCS33 with factory insulation	
Temp. class	Max. ambient temperature	Max. process temperature	Max. ambient temperature	Max. process temperature
T6	50°C / 122°F	60°C / 140°F	60°C / 140°F	60°C / 140°F
T5	50°C / 122°F	80°C / 176°F	80°C / 176°F	90°C / 194°F
T4	80°C / 176°F 50°C / 122°F	100°C / 212°F 120°C / 248°F	80°C / 176°F	130°C / 266°F
T3	80°C / 176°F	150°C / 302°F	80°C / 176°F	150°C / 302°F
T2	80°C / 176°F	150°C / 302°F	80°C / 176°F	150°C / 302°F

	RCCS34 to RCCS39/XR without insulation		RCCS34 to RCCS39/XR with factory insulation		RCCT34 to RCCT39/XR	
Temp. class	Max. ambient temperature	Max. process temperature	Max. ambient temperature	Max. process temperature	Max. ambient temperature	Max. process temperature
T6	40°C / 104°F	40°C / 104°F	65°C / 149°F	65°C / 149°F	55°C / 122°F	65°C / 149°F
T5	55°C / 131°F	55°C / 131°F	75°C / 167°F	75°C / 167°F	55°C / 122°F	80°C / 176°F
T4	80°C / 176°F 40°C / 104°F	100°C / 212°F 120°C / 248°F	70°C / 158°F	115°C / 239°F	55°C / 122°F	115°C / 239°F
T3	80°C / 176°F 40°C / 104°F	160°C / 320°F 180°C / 356°F	70°C / 158°F	180°C / 356°F	55°C / 122°F	150°C / 302°F
T2	80°C / 176°F	220°C / 428°F	65°C /149°F	275°C / 527°F	55°C / 122°F	150°C / 302°F
T1	80°C / 176°F	220°C / 428°F	45°C / 113°F	350°C / 662°F	55°C / 122°F	150°C / 302°F

For customer insulation of RCCS30LR to 39/XR the following must be regarded :
The table "with factory insulation" is calculated with 80 mm insulation and k-factor = 0.4 W/m²K.
If your insulation data are worse than these use table "without insulation" !

INMETRO APPROVAL (For Brazil)

RCCS3x with option /US1.same as IECEx /ES1
RCCT3x with options /UF1 ... /UF2 same as IECEx /EF1 ... /EF2
RCCF31 with options /UF1 ... /UF2 same as IECEx /EF1 ... /EF2
RCCR31 with option /US1 same as IECEx /ES1
Same parameters and specifications as IECEx approval.

NEPSI APPROVAL (For China)

Certificate GYJ12.1381X
RCCS3x with option /NS1, RCCT3x with options /NF1 ... /NF2,
RCCF31 with options /NF1 ... /NF2 , RCCR31 with option /NS1
Same parameters and specifications as IECEx approval except NEPSI has no dust proof certification.

KOSHA APPROVAL (For Korea)

Same parameters and specifications as IECEx approval.
Meter with IECEx option must be ordered.

METROLOGICAL REGULATION IN CIS (GOST)

Rotamass has “Pattern Approval Certificate of Measuring Instruments” and is registered as a measuring instrument in Russia, Kazakhstan, Uzbekistan, Belarus and Ukraine.
The calibration laboratory of Rota Yokogawa is approved by Federal Agency on Technical Regulating and Metrology in Russia and other Metrological Organizations in CIS countries to issue primary calibration confirmation for ROTAMASS, option /QR[].
Furthermore ROTAMASS is RTN (GGTN) approved for installation in hazardous areas.
For export to CIS countries please contact your Yokogawa representative.

PLANNING AND INSTALLATION HINTS

Design Limits
It is the responsibility of the user to use the instrument within the given design limits. Erosion and corrosion influence the accuracy and may restrict the temperature / pressure limits. Therefore corrosion and erosion should be avoided.

Installation
The flowmeter can be installed vertically, horizontally or in any other position, as long as the measuring tubes are completely filled with the measured liquid during measurement.

Redundant Installation

If two flowmeters of the same size are installed in series mutual interference called cross talk may take place. Cross talk occurs due to the fact that both meters have the same resonance frequency. If serial installation is planned please contact your Yokogawa representative who can ensure that a frequency adjustment is made to one of the meters at the factory.

Sizing
The measuring range and accuracy are virtually independent of fluid conditions and size of the connecting pipe. Select a suitable nominal size from pressure loss calculation. Check whether the measuring range and accuracy at minimal flow fit the application. The calculations of the pressure loss are based on Newtonian fluids. For correct calculation of the pressure drop use the YOKOGAWA Sizing software.

Sanitary Applications
For sanitary applications select process connection S2, S4 or S8. The wetted surface will be Ra ≤ 1.6 µm. However, if option /SFx is selected the surface roughness will be Ra < 0.8µm and with /SF2 a certificate with a 3- point roughness measurement certificate is delivered. The EHEDG certificate shows that ROTAMASS conforms to the EHEDG criteria regarding the capability to be cleaned by a CIP process. The evaluation does not include the process connections and seals.

Cavitation
To avoid cavitation keep the back pressure of the fluid sufficiently above the vapor pressure of the fluid. For low viscous fluids following condition should be fulfilled at the given temperature:

$p_{back} > p_{vapor} + 0.7*\Delta p$

With Δp = pressure loss (e.g. given by the Yokogawa sizing software)

Long Term Stability
To get stable deflection of the tubes by the Coriolis forces the stiffness and therefore the wall thickness has to kept constant during measuring. With corrosion or erosion the meter factor is drifting with time and recalibration is necessary. Select the suitable resistant tube material for the process!

Recalibration Service
Yokogawa offers via its European Flow Centre (Rota Yokogawa, Germany) full recalibration service, if necessary with a certificate traceable to German national standards. Please contact your Yokogawa affiliate or directly Rota Yokogawa, Germany.

Heat Tracing and Insulation

Basically the detector can be insulated by the customer. To be sure not to overheat the connection box choose one of /Tx options (insulation or heat tracing from Yokogawa). For temperatures between 150°C and 230°C choose /MT option and remote installation. If Rotamass detector with /MT or /HT is not insulated, the accuracy specification can not be guaranteed.
The converter should not be exceeded more than 50°C. Therefore never insulate the converter and keep the neck free from insulation too. Yokogawa will not take any liability regarding customer insulation.

Relations between Options /MT, /HT, /S2 and /Tx (/T1, /T2, /T3)
The meters with high temperature options (/MT, /HT) can be insulated either by the customer by using option /S2 (prolonged neck) or by the factory through options /Tx.
The /Tx options already include the option /S2 so that the /S2 option can not be selected in case of the /Tx options.
If the meter is not properly insulated by the customer, the accuracy specification can not be guaranteed.

Installation above 100°C Process Temperature
To provide enough cooling the instrument should be installed vertically or horizontally with the converter down. This is recommended for size RCCTx36 and larger without /Tx option.

Installation below 0°C Process Temperature
The detector can be insulated to prevent ice capping either by the customer or by the manufacturer. Ask your Yokogawa representative for special insulation. If the customer wants to insulate by themselves a closed cell foam as insulation material is recommended to avoid water siphon. In this case option /S2 should be selected. For temperatures below -70°C option /LT is recommended (on request).

Zero Adjustment Function
Zero point can be adjusted either by setting the switches on display or with the HART® communication or with status input when the fluid flow is stopped and the detector filled. To ensure no flow conditions isolation valves should be installed. To achieve the specified accuracy a zero should be performed at process conditions (temp., pressure).

Pressure / Temperature Dependencies of Process Connections
See also process pressure limits in chapter ”Normal operation conditions”.

Rupture Disk
The rupture disk is used as annunciation method in the case of tube rupture (Dual Seal) preferable for high pressure gas service. Practically a tube rupture of ROTAMASS is not known to the manufacturer. For large sizes it cannot be expected that the full line pressure can be released via the rupture disk. If this is requested please contact Yokogawa for a special execution.

Density Measurement
There are 3 levels of density measurement. The standard adjustment and /K4 delivers an accuracy up to 0.001 g/cm³, if the fluid density is around 1 kg/l. However, at elevated temperatures the density error may increase. For option /K4 the instrument is preheated ensuring long term stability. However, if high density stability is needed at high temperatures option /HT is recommended. Option /K6 includes preheating, a full calibration at 3 different densities, increased temperature measurement specification and individual adjustment of the fluid temperature dependency. Multiphase flow can generate higher deviations. The higher the density differences of the single components are the more likely it is that a negative density error is generated. Aeration has to be avoided fully to receive good density measurement.
For more information please see TI 01R04B04-05E ”Density Measurement with ROTAMASS”.
Note: Density specification under calibration condition only with flow direction “forward” according the arrow on the meter.
Table 8: Overview density-/volume- flow measurement:

Option	Accuracy	Certificate	Description	Typical Application
Standard	± 0.0015 g/cm³ to ± 0.02 g/cm³	Standard (mass flow) factory calibration certificate	- Standard adjustment with water and air - Density constants given in mass flow certificate	- Process medium and environment are approximately at room temperature, the density range is 0.9 kg/l to 1.1 kg/l
Option /K4	± 0.001 g/cm³	Standard (mass flow) factory calibration certificate	- Thermal treatment of the sensor and special hardware design - Standard adjustment with water and air - Density constants given in mass flow certificate	- Improved volume flow accuracy - Process medium up to 150°C, for higher temperature select option /HT - Density range is 0.9 kg/l to 1.1 kg/l
Option /K6	± 0.0005 g/cm³	Separate factory density calibration certificate	- Thermal treatment of the sensor and special hardware design - Density calibration with 3 different liquids - Individual adjustment of the fluid temperature dependency	- Density and concentration measurement in addition to the mass flow: - Process medium up to 150°C, for higher temperature select option /HT - Density range 0.3 kg/l to 2.5 kg/l - Best volume flow accuracy

Explosion Proof Concept
The detector is intrinsically safe Ex ib, the converter RCCT and RCCF31 are flame (explosion) proof. The converter RCCR31is an intrinsically safe associated apparatus. The driving power from converter to detector is limited and protected by an intrinsically safe barrier, which is part of the converter. The barrier is protecting the detector either for gas group IIC or IIB (option /HP).
Option /KF2 delivers one passive intrinsic safe current and one pulse output, however the converter is flame (explosion) proof.

Option /HP
With option /HP the detector driving power is higher which is benefit to 2 phase flow. This is also true for non hazardous applications.

Gas Measurement
For gas applications please choose the option /GA.
Density reading below 0.3 kg/l is not possible. Volume flow is calculated by using the fix density value stored in „Reference density“.
Based on the selection of the gas density, the following volume flow rates can be calculated; standard, reference, normal.
Besides, the corresponding volume flow rate units can be selected. Some functions are unavailable for gas measurement, including concentration measurement, empty pipe, slug or corrosion detection.
Good and stress free installation is mandatory for a stable Zero.
Attention to resonance phenomenons has to be taken if gas compressors are used in the pipe. Flow noise has to be avoided.

Batch Process
The specified mass flow accuracy applies if the batch process is >1 minute. For shorter batch time (Δt in s) the accuracy decreases with the square root of $60/\Delta t$.
For short batches the opening and closing times of the valves have to be longer than 2 seconds.

Concentration Measurement for Liquids
The Standard Concentration Measurement (option /CST) is suitable for concentration measurement of emulsions or suspensions, where the density of the solid is assumed to be fix. It can also be used for (mainly low concentration) solutions if the two fluids are not strongly interacting. The density change of the liquid components due to temperature can normally be described with a linear or quadratic function with very high accuracy within the desired measurement range. The coefficients of these function (linear and quadratic thermal expansion coefficients) must be either known or have to be determined prior to using this function.
For interacting liquids the Advanced Concentration Measurement options should be used, these options can be ordered using the appropriate /Cxx concentration measurement option. For more information please see TI 01R04B04-04E-E “Concentration Measurement with ROTAMASS”.

Table 9 : Pressure rating

Type of process connection [1]		Process Temperature							
		RT [2]	50°C (120°F)	100°C (210°F)	150°C (300°F)	200°C (390°F)	250°C (480°F)	300°C (570°F)	350°C (660°F)
A1	Flange acc. ASME B16.5 Class 150	15.9 bar	15.3 bar	13.2 bar	12.0 bar	11.0 bar	10.2 bar	9.7 bar	8.4 bar
A2	Flange acc. ASME B16.5 Class 300	41.4 bar	40.0 bar	34.5 bar	31.2 bar	28.7 bar	26.7 bar	25.2 bar	24.0 bar
A3	Flange acc. ASME B16.5 Class 600	82.7 bar	80.0 bar	69.9 bar	62.8 bar	58.3 bar	54.9 bar	52.1 bar	50.1 bar
A4	Flange acc. ASME B16.5 Class 900	124.1 bar	120.1 bar	104.4 bar	94.2 bar	87.5 bar	82.4 bar	78.2 bar	75.2 bar
A5	Flange acc. ASME B16.5 Class 1500	206.8 bar	200.1 bar	173.9 bar	157.0 bar	145.8 bar	137.3 bar	130.3 bar	125.4 bar
D2	Flange acc. EN 1092-1 PN 16	16 bar	15.6 bar	14.2 bar	12.8 bar	11.7 bar	10.9 bar	10.3 bar	9.9 bar
D4	Flange acc. EN 1092-1 PN 40	40 bar	39.1 bar	35.6 bar	32.0 bar	29.3 bar	27.2 bar	25.8 bar	24.7 bar
D5	Flange acc. EN 1092-1 PN 63	63 bar	61.6 bar	56.0 bar	50.4 bar	46.2 bar	42.8 bar	40.6 bar	38.9 bar
D6	Flange acc. EN 1092-1 PN 100	100 bar	97.7 bar	97.7 bar	80.0 bar	73.3 bar	68.0 bar	64.4 bar	61.8 bar
G9	Internal thread RCCS30LR ... 33	285	271	247	227	----------			
T9	Internal thread NPT RCCS30LR ... 33	285	271	247	227	----------			
G9 [3]	Internal thread RCCS34	260	251	231	208	190	178	167	160
T9 [3]	Internal thread NPT RCCS34	260	251	231	208	190	178	167	160

		Process Temperature			
		up to 120°C (248°F)	220°C (428°F)	300°C (572°F)	350°C (662°F)
J1	Flange acc. JIS B 2220 10K	14 bar (203 psi)	12 bar (174 psi)	10 bar (145 psi)	------
J2	Flange acc. JIS B 2220 20K	34 bar (493 psi)	31 bar (449 psi)	29 bar (420 psi)	26 bar (377 psi)

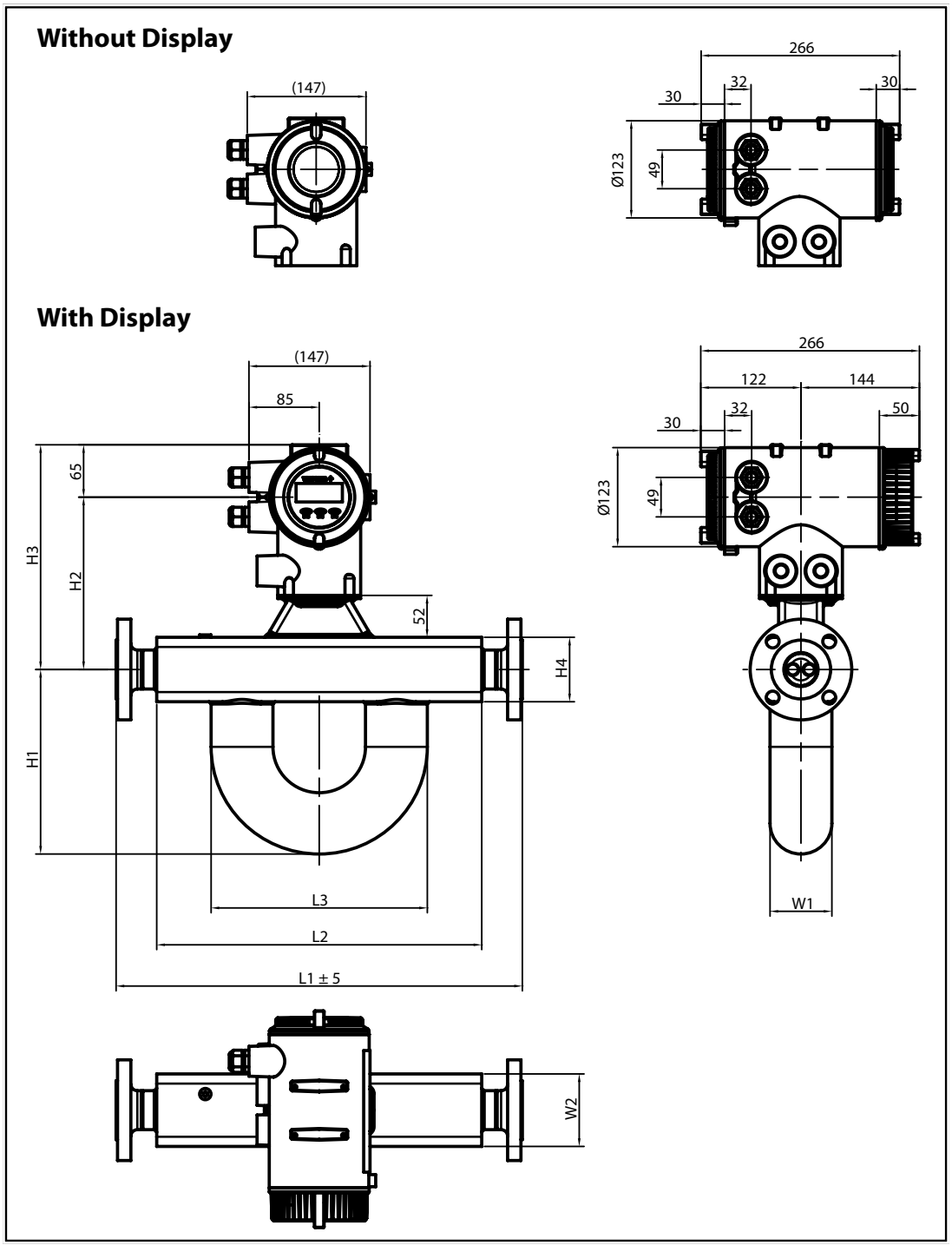
			Process Temperature	
			up to 140°C (284°F) [*]	
S2	Pipe connection acc. DIN 11851	up to DN 40	40 bar (580 psi)	[*] under the restriction using suitable gasket materials
		DN 50 to DN 100	25 bar (362 psi)	
		above DN 100	16 bar (232 psi)	

			Process Temperature	
			up to 150°C (302°F) [**]	
S4	Clamp connection acc. DIN 32676	up to DN 50	16 bar (232 psi)	[**] under the restriction using suitable gasket materials
		above DN 50	10 bar (145 psi)	
S8	Clamp acc. Mini-Clamp	up to 1/2´´	16 bar (232 psi)	
	Clamp acc. Tri-Clamp®	up to 2´´	16 bar (232 psi)	
		above 2´´	10 bar (145 psi)	

[1] all process connections are made of material 1.4404 / 1.4435 (equivalent to group 2.3 material AISI 316L acc. ASME B16.5)
[2] RT = Room Temperature; EN1092: -10°C to 50°C; ASME B16.5: -29°C to 38°C (-20°F to 100°F)
[3] for option /DS max. pressure according A4. ASME class 900

DIMENSIONS

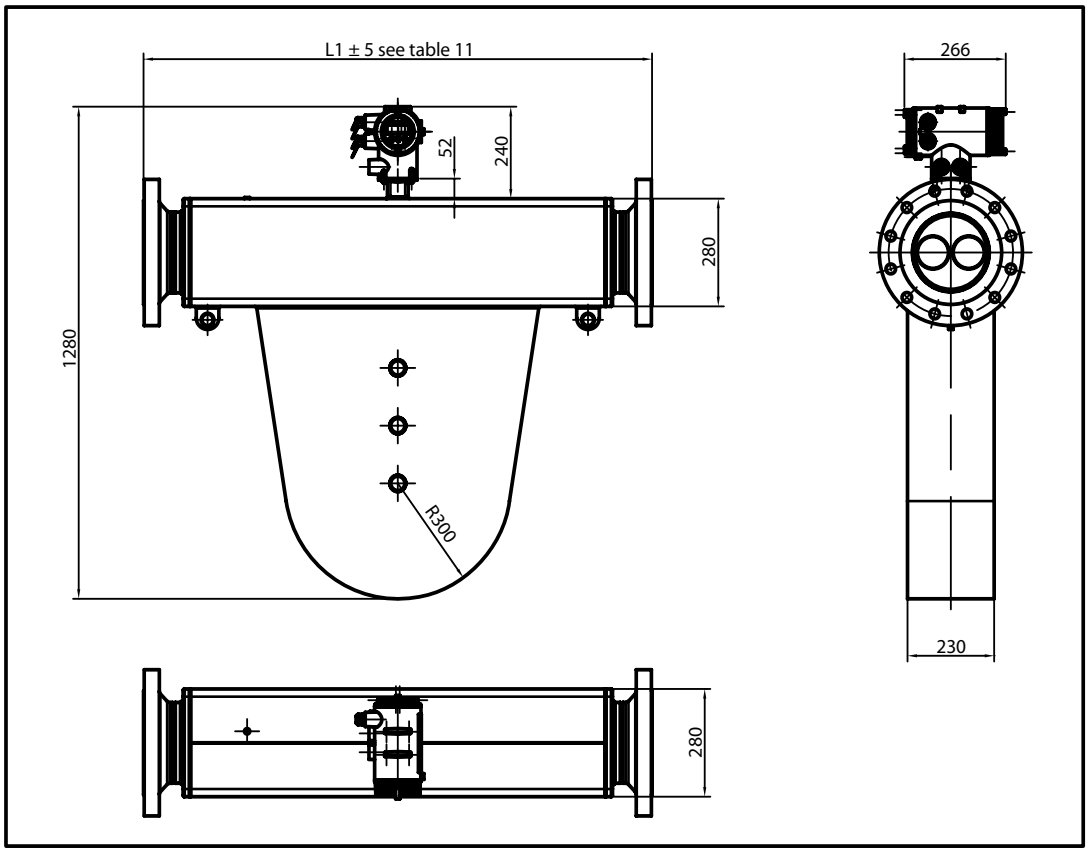
Integral Type RCCT34 39/IR



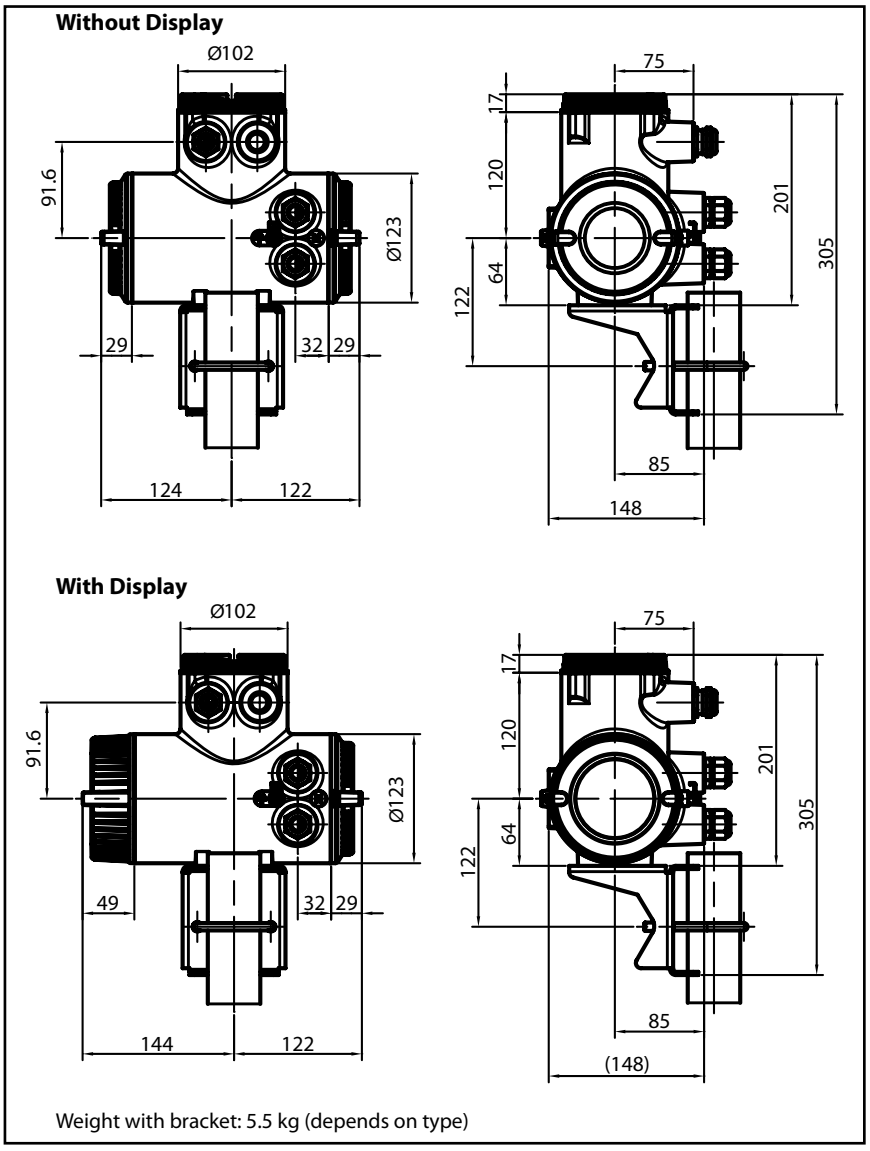
Note: The flange dimensions depend on size and pressure rating of the flange.

Model		L1	L2	L3	H1	H2	H3	H4	W1	W2	Weight
RCCT34	[mm]	see tabel 11	272	212	177	214	279	80	60	80	13-24 kg
RCCT36	[mm]	see tabel 11	400	266	230	214	279	80	76	90	17.5-38 kg
RCCT38	[mm]	see tabel 11	490	267	269	224	289	100	89	110	35.5-53 kg
RCCT39	[mm]	see tabel 11	850	379	370	240	306	135	129	160	63-105 kg
RCCT39/IR	[mm]	see tabel 11	870	454	452	272	338	200	154	200	61-116 kg
Dimensions in mm. Weights with smallest and biggest flanges											

Integral Type RCCT39/XR



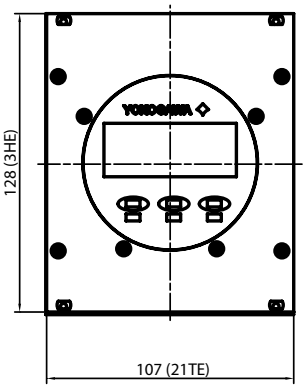
Remote field-mount Converter RCCF31



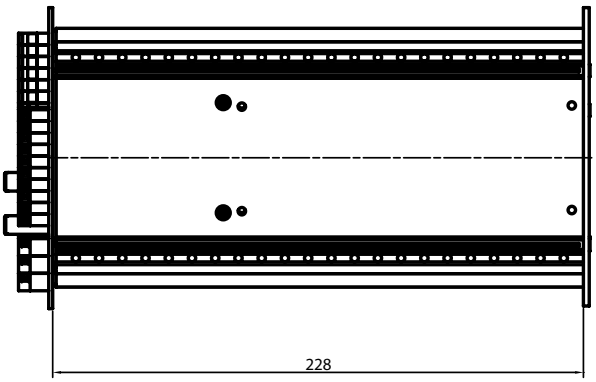
Weight with bracket: 5.5 kg (depends on type)

Remote rack-mount Converter RCCR31

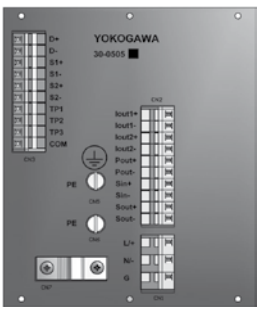
Cassette front view



Cassette, side view

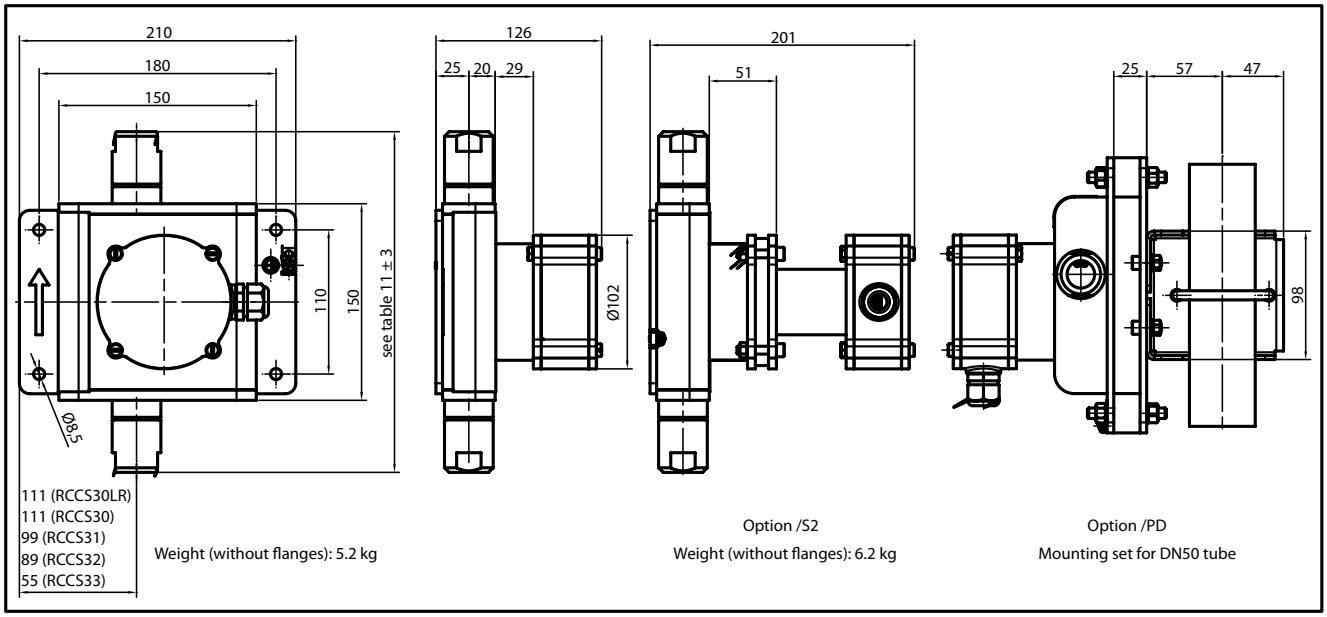


Terminal Board

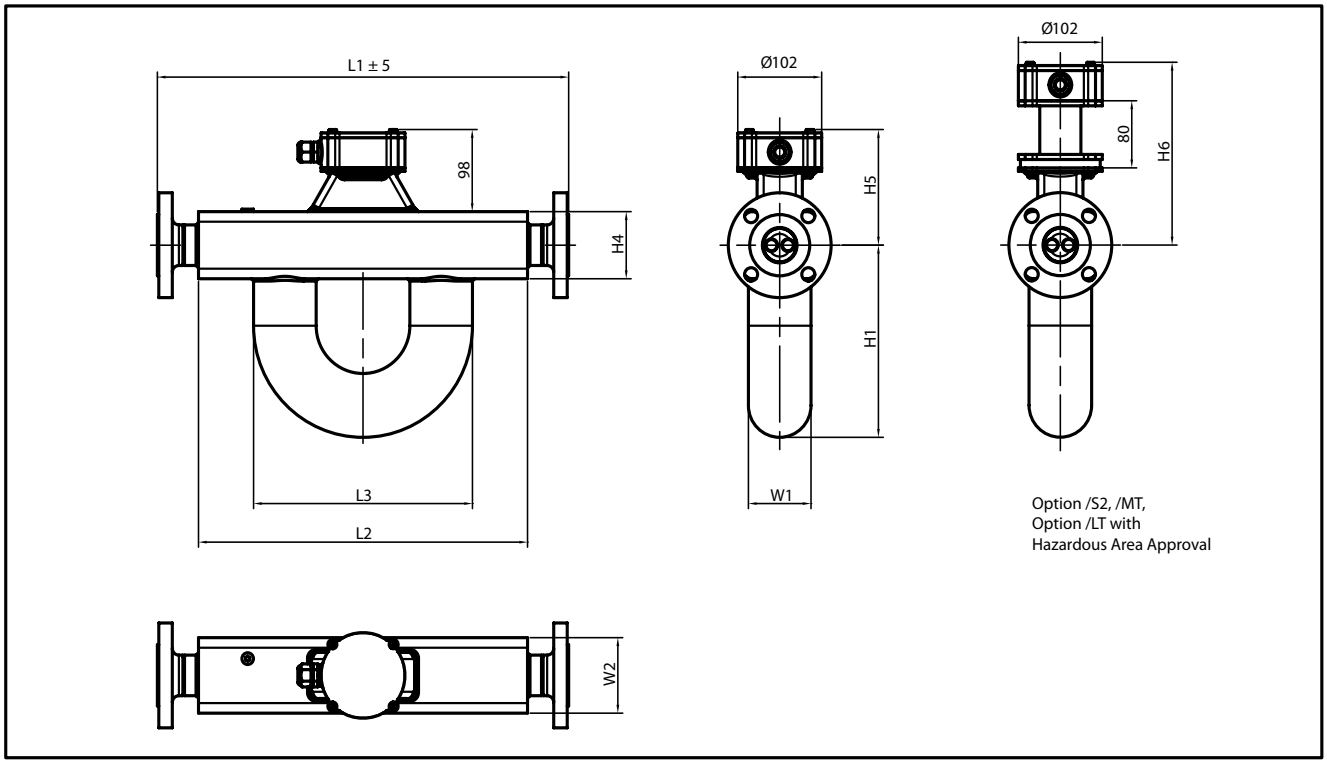


Dimensios in mm
19-inch rack, acc. IEC / DIN EN 60297-3-101
Weight: 1.5 kg

Remote Detector RCCS30LR - 33



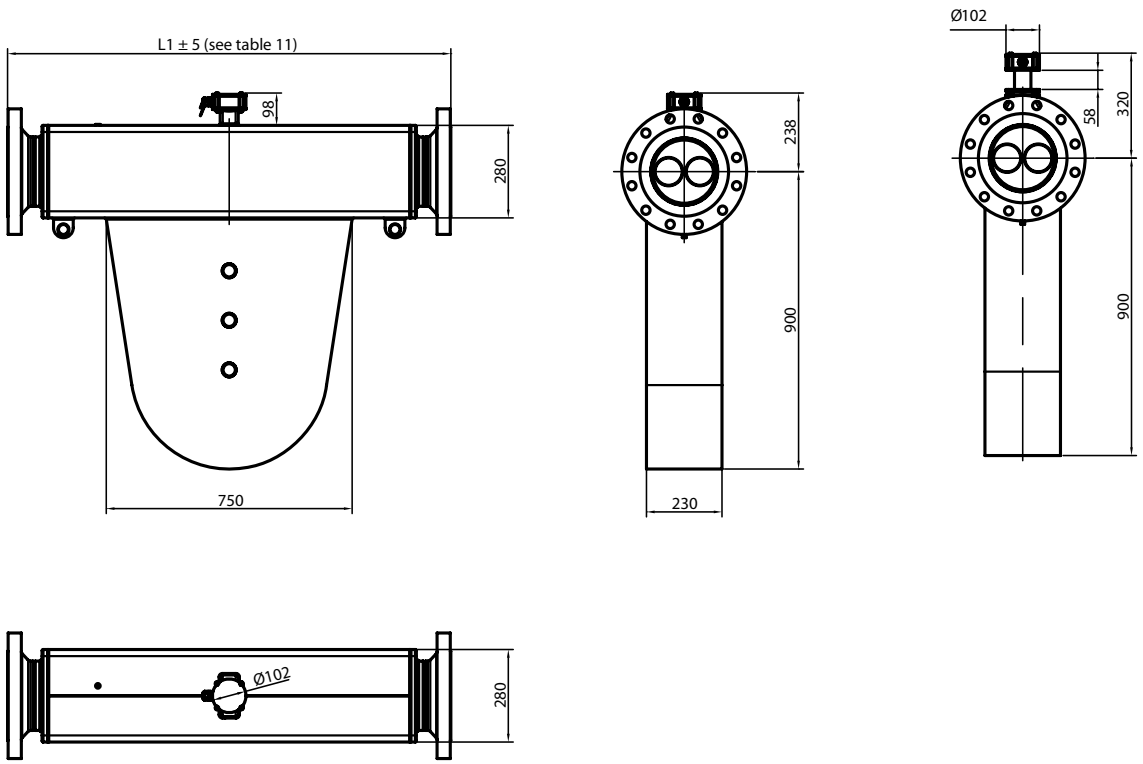
Remote Detector RCCS34 - 39/IR



Note: The flange dimensions depend on size and pressure rating of the flange.

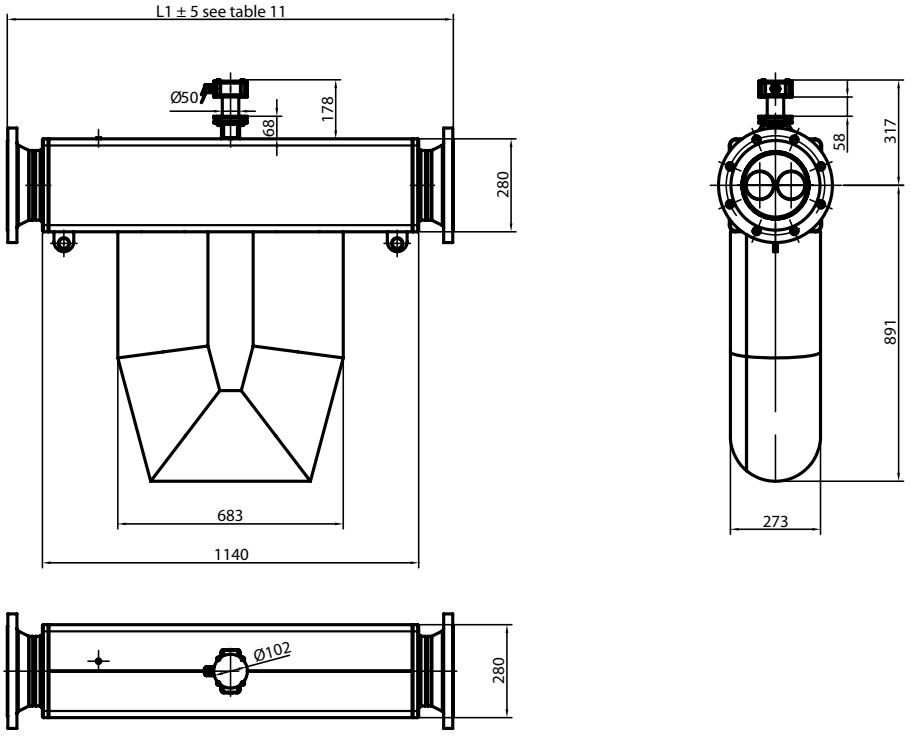
Model		L1	L2	L3	H1	W1	W2	H4	H5	H6	Weight
RCCS34	[mm]	see tabel 11	272	212	177	60	80	80	138	218	10-21 kg
RCCS36	[mm]	see tabel 11	400	266	230	76	90	80	138	218	14.5-35 kg
RCCS38	[mm]	see tabel 11	490	267	269	89	110	100	148	228	32.5-50 kg
RCCS39	[mm]	see tabel 11	850	379	370	129	160	135	166	246	60-102 kg
RCCS39/IR	[mm]	see tabel 11	870	454	452	154	200	200	198	278	58-113 kg
Dimensions in mm. Weights with smallest and biggest flanges											

Remote Detector RCCS39/XR

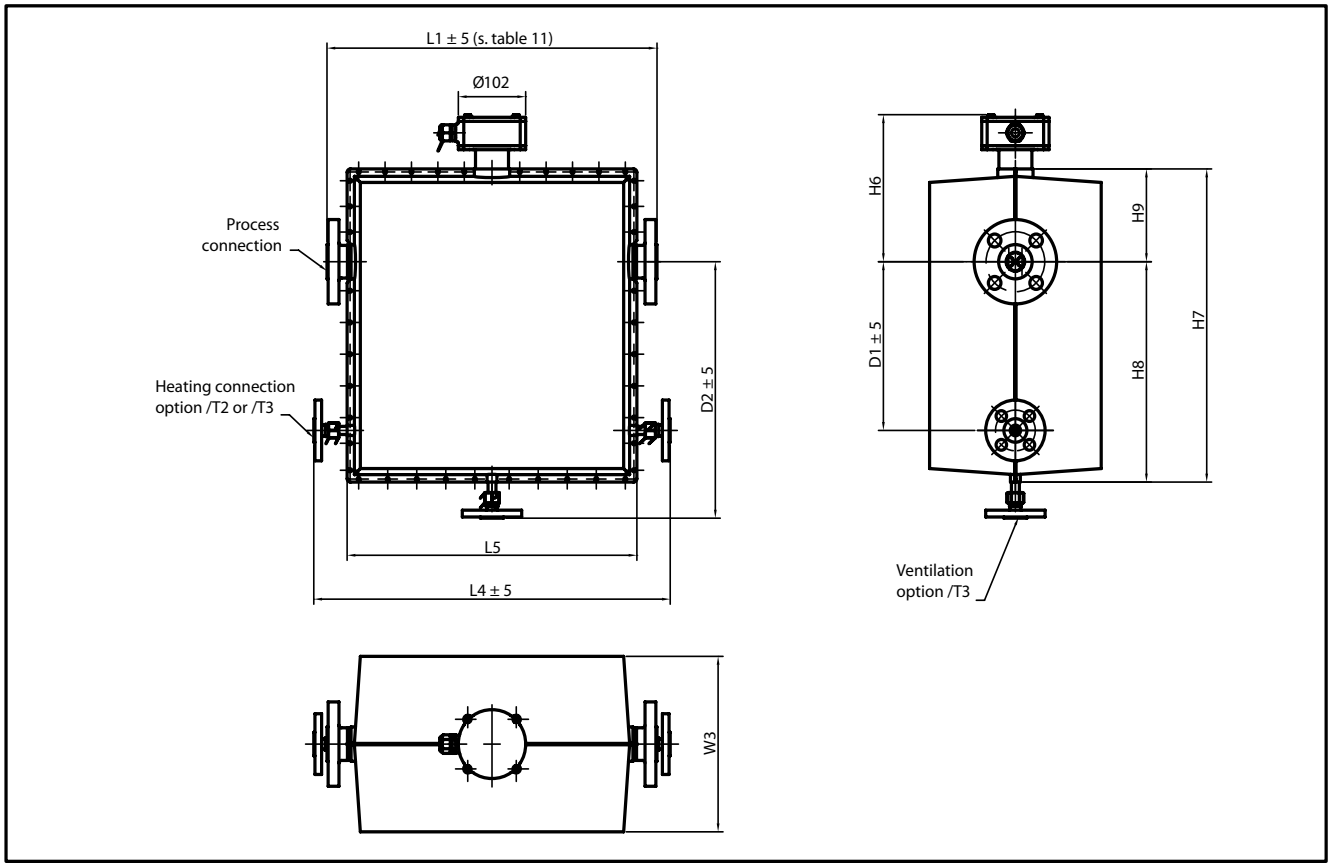


Dimensions in [mm]
Weight: 290-320 kg (depends on flanges)

Remote Detector RCCS39/XR with option /HT



Remote Detector RCCS34 - 39/IR with option /Tx (Insulation / Heating)



Note: The flange dimensions depend on size and pressure rating of the flange.

Model		L1	L4	L5	D1	D2	H6	H7	H8	H9	W3	Weight
RCCS34	mm	see table 11	420	310	200	330	218	411	273	138	240	19-30 kg
RCCS36	mm	see table 11	540	439	250	380	218	464	326	138	260	26.5-47 kg
RCCS38	mm	see table 11	640	530	250	430	228	524	376	148	260	47.5-65 kg
RCCS39	mm	see table 11	1000	894	350	545	245	668	503	165	302	95-137 kg
RCCS39/IR	mm	see table 11	1040	932	350	570	278	726	528	198	342	95-150 kg

Dimensions in mm. Weights with smallest and biggest flanges including insulation cover and heat tracing.
Standard heating connection according table 10.

Remote Detector RCCS30LR - 33 with option /Tx (Insulation / Heating)

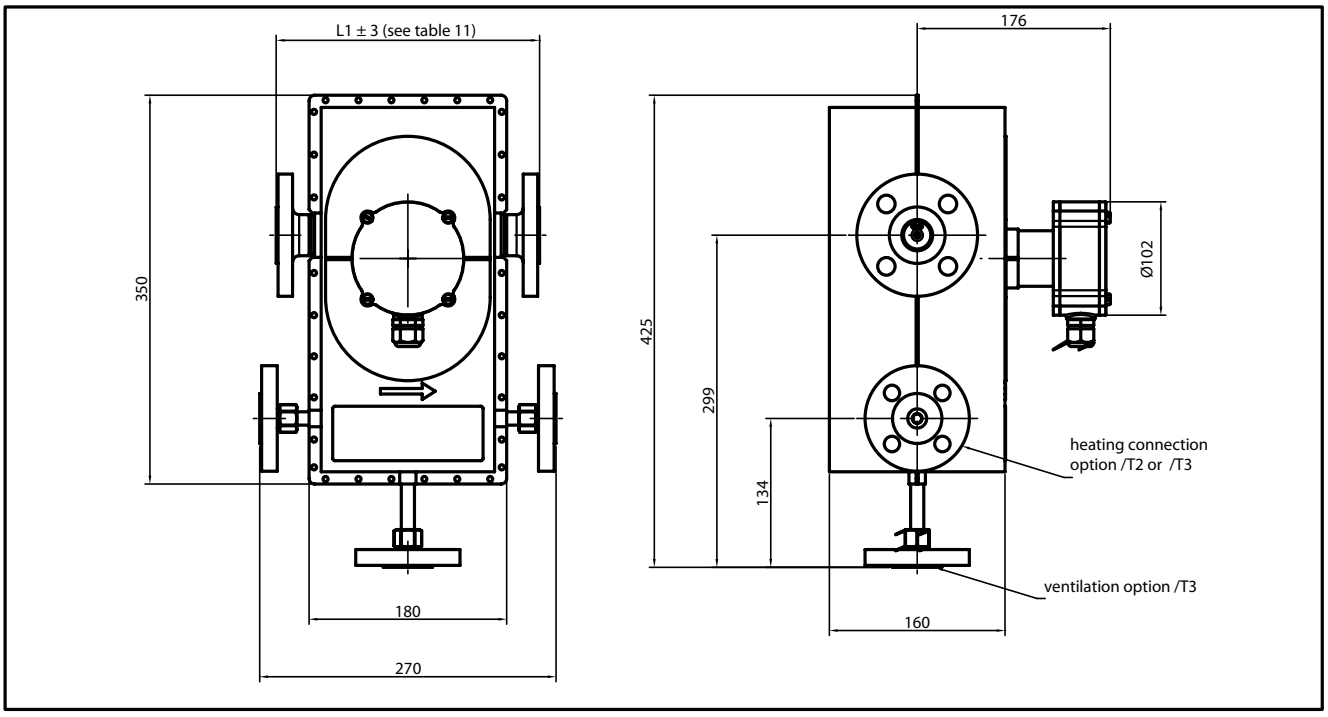
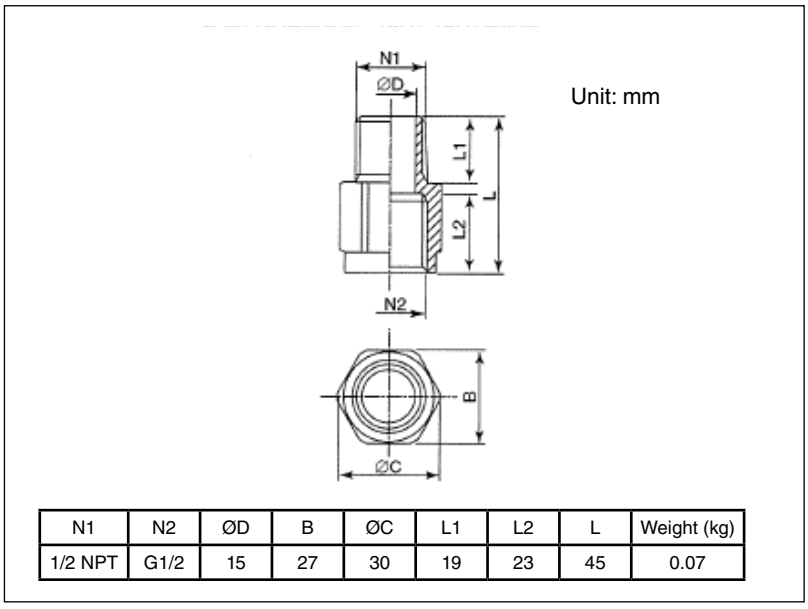


Table 10: Heat tracing connection types depending on process connection type

Process connection	Standard heating connection *)
Ax	ASME ½´´ - 150
Dx	EN DN 15 PN 40
Jx	JIS 10K DN15
S2 ; S4	EN DN 15 PN 40
S8	ASME ½´´ - 150
G9	EN DN 15 PN 40
T9	ASME ½´´ - 150

*) others on request

Adapter 1/2´´ NPT - G1/2 (option /AD2)



N1	N2	ØD	B	ØC	L1	L2	L	Weight (kg)
1/2 NPT	G1/2	15	27	30	19	23	45	0.07

MODEL, SUFFIX AND OPTION CODES

Integral Type RCCT3, Model and Suffix Code

Model	Suffix Code	Description	Restrictions
RCCT34 RCCT36 RCCT38 RCCT39 RCCT39/IR RCCT39/XR		Nominal Value : 3 t/h = 50 kg/min Nominal Value : 10 t/h = 170 kg/min Nominal Value : 32 t/h = 533 kg/min Nominal Value : 100 t/h = 1670 kg/min Nominal Value : 250 t/h = 4170 kg/min Nominal Value : 500 t/h = 8340 kg/min	 only with /HP
Power supply	-A -D	90 - 264 V AC 24 V DC	
Indicator direction	H1 H2 V0 N0	Detector installation horizontal, tubes down Detector installation horizontal, tubes up Detector installation vertical Without indicator	recom. for liquid service recom. for gas service /GA
Cable conduit connection	M A	M20 x 1.5, female thread with cable glands ANSI ½´´ NPT, female thread without cable glands	 mandatory with /FF1, /FF2
Process connection size [1]	23 01 02 04 05 06 08 10 12 15 20	¾´´ DN 15, ½´´ DN 25, 1´´ DN 40, 1½´´ DN 50, 2´´ DN 65, 2½´´ DN 80, 3´´ DN 100, 4´´ DN 125, 5´´ DN 150, 6´´ DN 200, 8´´	see table 11 see table 11 see table 11 see table 11 see table 11 see table 11 see table 11 see table 11 see table 11 see table 11 see table 11
Process connection rating and style [1]	A1 A2 A3 A4 A5 D2 D4 D5 D6 J1 J2 S2 S4 S8 G9 T9	ASME flange class 150, process connection dim. + facing acc. ASME B16.5 ASME flange class 300, process connection dim. + facing acc. ASME B16.5 ASME flange class 600, process connection dim. + facing acc. ASME B16.5 ASME flange class 900, process connection dim. + facing acc. ASME B16.5 ASME flange class 1500, process connection dim. + facing acc. ASME B16.5 EN flange PN 16, process connection dim. + facing acc. EN 1092-1 Form B1 EN flange PN 40, process connection dim. + facing acc. EN 1092-1 Form B1 EN flange PN 63, process connection dim. + facing acc. EN 1092-1 Form B1 EN flange PN 100, process connection dim. + facing acc. EN 1092-1 Form B1 JIS flange 10K, JIS B 2220 JIS flange 20K, JIS B 2220 Thread acc. DIN 11851 Clamp, process connection dimensions acc. DIN 32676 Clamp, process connection dim. acc. Tri-Clover® (Tri-Clamp®) and ½´´ Mini Clamp G, female thread NPT female thread	see table 11 see table 11 see table 11 see table 11 see table 11 see table 11 see table 11 see table 11 see table 11 see table 11 see table 11 see table 11 see table 11 see table 11 see table 11 see table 11
Material of wetted parts [1]	SL HC	Stainless steel 316L (1.4404) Hastelloy C-22 (2.4602)	 only RCCT34 to 39/IR

[1] see selection table „Process connection and materials“ (table 11)

Integral Type RCCT3, Option Code :

Options	Option code	Description	Restrictions
Hazardous Area Approvals	/KF1	ATEX Flame proof converter + Intrinsic safe detector	with /HP for gas group IIB
	/KF2	ATEX Flame proof converter + Intrinsic safe detector + Intrinsic safe outputs	with /HP for gas group IIB
	/FF1	FM approval for USA+Canada, Flame proof converter + Intrinsic safe detector + 2 active analog outputs + 2 passive pulse outputs + 1 status input	only with cable conduit ´A´; with /HP not for groups A and B
	/FF2	FM approval for USA+Canada, Flame proof converter + Intrinsic safe detector + 1 passive analog output + 1 passive pulse output	only with cable conduit ´A´; with /HP not for groups A and B
	/EF1	IECEx Flame proof converter + Intrinsic safe detector	with /HP for gas group IIB
	/EF2	IECEx Flame proof converter + Intrinsic safe detector + Intrinsic safe outputs	with /HP for gas group IIB
	/UF1	INMETRO Flame proof converter + Intrinsic safe detector	with /HP for gas group IIB
	/UF2	INMETRO Flame proof converter + Intrinsic safe detector + Intrinsic safe outputs	with /HP for gas group IIB
	/NF1	NEPSI Flame proof converter + Intrinsic safe detector	with /HP for gas group IIB
	/NF2	NEPSI Flame proof converter + Intrinsic safe detector + Intrinsic safe outputs	with /HP for gas group IIB
Custody Transfer Measurement acc. OIML R 117-1	/Q01	European MID Approval (fluids other than water) (refer to GS 01R04B07-00E)	not with /NM
	/Q20	NTEP approval 12-080A1, Accuracy class 0.3 acc. NIST Handbook 44 (refer to GS 01R04B07-00E)	only RCCT34 to 39; Ex type only with /FF1 or /FF2
GOST	/QR1	Primary Calibration and Test Confirmation valid in Russia	see page 9; not with /Q20
	/QR2	Primary Calibration and Test Confirmation valid in Kazakhstan	see page 9; not with /Q20
	/QR3	Primary Calibration and Test Confirmation valid in Uzbekistan	see page 9; not with /Q20
Dual Seal Approval	/DS	Dual Seal approval (conform with ANSI/ISA-12.27.01)	only with /FF1; not with process connection A5; preferable with /GA, mandatory if /DS+/GA is selected
	/RD	Rupture disk, rupture pressure 20 bar, nominal diameter 8 mm	

Integral Type RCCT3, Option Code (continued)

Options	Option code	Description	Restrictions
High Driving Power	/HP	High Driving Power	not for RCCT34, recommended for RCCT36 to 39, strongly recommended for RCCT39/IR, mandatory for RCCT39/XR [1]: Please see „ Hazardous Area Specifications“
Communication	/MB1	Modbus communication protocol for selected parameters and values	not with /Q01, /Q20, /KF2, /EF2, /UF2, /FF2, /NF2
Active Pulse Output	/AP	One active pulse output	not with /KF2, /EF2, /UF2, /NF2, /NM
NAMUR Switch	/NM	One pulse output acc. to EN 60947-5-6 (NAMUR)	not with /AP
Tag Number	/BG	With customer specified tag number on name plate	max. 16 digits
HART® Tag Number (Software Tag)	/BT1	With customer specified tag number for HART® communication in converter	8 digits for tag, 22 digits for long tag
Flange Facing	/DN /RJ	Flange with safety grooves acc. to EN 1092-1 form D Ring Type Joint Flanges	only for D2 to D6; not HC only for A3, A4, A5; not HC
Gas Measurement	/GA	Gas measurement, special factory adjustments and settings	to be conform with ANSI/ISA-12.27.01 select /RD; not with /Q20
Special Calibration	/K2 [2] /K4 /K5 [2] /K6	Custom 5 pts mass-/volume-flow calibration using water with factory certificate (traceable to German national standards) Density adjustment + thermal treatment; (accuracy: 0.001 g/cm³) Custom 10 pts mass-/volume-flow calibration using water with DKD certificate (according EN-17025:2005) Density calibration with 3 different fluids incl. individual temperature compensation with certificate (accuracy: 0.0005 g/cm³)	 only RCCT34 to 39; not with /GA only RCCT34 to 39; not with /GA
Certificates	/P2 /P3 /P6 /P8 /H1 /WP	Certificate of compliance with the order acc. to EN 10204:2004 -2.1 As /P2 + Test report acc. to EN 10204: 2004 -2.2 (QIC) Material certificate acc. to EN 10204: 2004 -3.1 Pressure test report measuring system Oil and fat free for wetted surface acc. to ASTM G93-03 level C WPS acc. DIN EN ISO 15609-1 (Welding Procedure Specification) WPQR acc. DIN EN ISO 15614-1 (Welder Performance Qualification Record) WQC acc. DIN EN 287-1 (Welder Qualification Certificate)	 only for butt weld between process connection and flow divider; not for material HC
Sanitary Type	/SF1 /SF2 /SA /SE	Surface roughness Ra = 0.8 µm As /SF1 + Test report roughness of wetted parts As /SF2 + 3A- declaration of conformity and 3A- mark As /SF2 + EHEDG certificate	only RCCT34 to 39; not with RCCT34 /K4 and RCCT34 /K6; only process connections S2, S4, S8; see also restrictions in table 11 not with process connection S2 not with process connection S2
Customer Presetting	/PS	Presetting sheet with customer data	has to be issued with the order
Housing Pressure Test	/J1	Rupture pressure proof test and certificate (see page 4)	not for RCCT39/XR
X-Ray Examination	/RT	X-ray examination of flange welding	RCCT34 with /K4 or /K6 only one-sided; not with HC
PMI Examination	/PM6	PAMI test (6 test points: process connection inlet + outlet, measuring tubes, flow divider inlet + outlet) [3]	
Dye Penetration Test	/PT	Dye penetration test of flange welding	
Epoxy Coating	/X1	Epoxy coating of converter housing	
Concentration Measurement [4]	/CST /Cxx	Standard concentration measurement Advanced concentration measurement, details see table „Advanced Concentration Measurement Options“	not with /GA not with /GA
Delivery to Japan	/PJ	For meters which are delivered to Japan, with SI-unit preset	
Delivery to Korea	/KC	With KC-mark for Korea	
Cable glands	/AD2	2 pcs ANSI 1/2“ NPT / G1/2 adapter	only with cable conduit ´A´
Instruction Manuals	/IEn /IDn /IFn	Quantity of instruction manuals in English Quantity of instruction manuals in German Quantity of instruction manuals in French	n = 1 to 3 selectable [5] n = 1 to 3 selectable [5] n = 1 to 3 selectable [5]
Quick Delivery	/QD	Delivery within 24 hours from factory	Delivery scope please refer to “Quick Delivery Possibilities” or contact Yokogawa sales office.
Special order	/Z	Special design must be specification an extra sheet	

[1] For gas application /GA RCCT39/XR can also be ordered without /HP.
[2] Calibration order sheet must be delivered with the order. This is available on the Flow Center Page at Coriolis/RCCx3/Technical Information.
[3] Measuring tube PAMI test is performed per delivery batch.
[4] For detailed information please see TI 01R04B04-04E-E. Concentration measurement is recommended with option /K6.
[5] If no instruction manual is selected, only a DVD with instruction manuals is shipped with the instrument. More than 3 manuals of one language on request.

Remote Detector RCCS3, Model and Suffix Code

Model	Suffix Code	Description	Restrictions
RCCS30LR		Nominal Value : 0.021 t/h = 0.35 kg/min	
RCCS30		Nominal Value : 0.045 t/h = 0.75 kg/min	
RCCS31		Nominal Value : 0.17 t/h = 2.8 kg/min	
RCCS32		Nominal Value : 0.37 t/h = 6.2 kg/min	
RCCS33		Nominal Value : 0.95 t/h = 16 kg/min	
RCCS34		Nominal Value : 3 t/h = 50 kg/min	
RCCS36		Nominal Value : 10 t/h = 170 kg/min	
RCCS38		Nominal Value : 32 t/h = 533 kg/min	
RCCS39		Nominal Value : 100 t/h = 1670 kg/min	
RCCS39/IR		Nominal Value : 250 t/h = 4170 kg/min	
RCCS39/XR		Nominal Value : 500 t/h = 8340 kg/min	select affiliated RCCF31 or RCCR31 with /HP
Cable conduit connection	-M	M20 x 1.5, female thread with cable glands	
	-A	ANSI ½´´ NPT, female thread only with cable gland for detector connection	mandatory with /FS1
Process connection size [1]	41	¼´´	see table 11
	01	DN 15, ½´´	see table 11
	23	¾´´	see table 11
	02	DN 25, 1´´	see table 11
	04	DN 40, 1½´´	see table 11
	05	DN 50, 2´´	see table 11
	06	DN 65, 2½´´	see table 11
	08	DN 80, 3´´	see table 11
	10	DN 100, 4´´	see table 11
	12	DN 125, 5´´	see table 11
	15	DN 150, 6´´	see table 11
	20	DN 200, 8´´	see table 11
Process connection rating and style [1]	A1	ASME flange class 150, process connection dim. + facing acc. ASME B16.5	see table 11
	A2	ASME flange class 300, process connection dim. + facing acc. ASME B16.5	see table 11
	A3	ASME flange class 600, process connection dim. + facing acc. ASME B16.5	see table 11
	A4	ASME flange class 900, process connection dim. + facing acc. ASME B16.5	see table 11
	A5	ASME flange class 1500, process connection dim. + facing acc. ASME B16.5	see table 11
	D2	EN flange PN 16, process connection dim. + facing acc. EN 1092-1 Form B1	see table 11
	D4	EN flange PN 40, process connection dim. + facing acc. EN 1092-1 Form B1	see table 11
	D5	EN flange PN 63, process connection dim. + facing acc. EN 1092-1 Form B1	see table 11
	D6	EN flange PN 100, process connection dim. + facing acc. EN 1092-1 Form B1	see table 11
	J1	JIS flange 10K, JIS B 2220	see table 11
	J2	JIS flange 20K, JIS B 2220	see table 11
	S2	Thread acc. DIN 11851	see table 11
	S4	Clamp, process connection dimensions acc. DIN 32676	see table 11
	S8	Clamp, process connection dim. acc. Tri-Clover® (Tri-Clamp®) and ½´´ Mini Clamp	see table 11
	G9	G female thread	see table 11
	T9	NPT female thread	see table 11
Material of wetted parts [1]	SH	316L (1.4404) and Hastelloy C-22 (2.4602) for tube	only RCCS30LR to 33
	SL	Stainless steel 316L (1.4404)	only RCCS34 to 39/XR
	HC	Hastelloy C-22 (2.4602)	only RCCS34 to 39/IR

[1] see selection table „Process connection and materials“ (table 11)

Remote Detector RCCS3, Option Code

Options	Option code	Description	Restrictions
Hazardous Area Approvals [1]	/KS1	ATEX intrinsically safe approval	
	/FS1	FM intrinsically safe approval for USA + Canada	only with cable conduit ´A´
	/ES1	IECEx intrinsically safe approval	
	/US1	INMETRO intrinsically safe approval for Brazil	
	/NS1	NEPSI intrinsically safe approval for China	not with /LT
Custody Transfer Measurement acc. OIML R 117-1	/Q01	European MID Approval (fluids other than water) (refer to GS 01R04B07-00E)	
	/Q20	NTEP approval 12-080A1, Accuracy class 0.3 acc. NIST Handbook 44 (refer to GS 01R04B07-00E)	only RCCS33 to 39; Ex type only with /FS1
GOST [1]	/QR1	Primary Calibration and Test Confirmation valid in Russia	see page 9; not with RCCS30LR; not with /Q20
	/QR2	Primary Calibration and Test Confirmation valid in Kazakhstan	see page 9; not with RCCS30LR; not with /Q20
	/QR3	Primary Calibration and Test Confirmation valid in Uzbekistan	see page 9; not with RCCS30LR; not with /Q20
Dual Seal Approval	/DS	Dual Seal approval (conform with ANSI/ISA-12.27.01)	only RCCS34 to 39/XR; only with /FS1; not with process connection A5
	/RD	Rupture disk, rupture pressure 20 bar, nominal diameter 8 mm	only RCCS34 to 39/XR, preferable with /GA, not with /Tx, mandatory if /DS + /GA is selected
Tag Number	/BG	With customer specified tag number on name plate	max. 16 digits
Flange Facing	/DN	Flange with safety grooves acc. to EN 1092-1 form D	only for D2 to D6; not HC, for RCCS30LR only for 01D4 or 01D6
	/RJ	Ring Type Joint Flanges	only for A3, A4, A5; not HC, for RCCS30LR only for 01A3 or 01A5
Gas Measurement	/GA	Gas measurement, special factory adjustments and settings	select affiliated RCCF31 or RCCR31 with /GA; to be conform with ANSI/ISA-12.27.01 select /RD; not with /Q20
Low temperature version	/LT	-200°C < T_{medium} < 150°C	not RCCS30LR to 33; not with /MT, /HT, /Q01, /Tx ; in combination with Hazardous Area Approval only with /S2
Extended temperature range	/MT	-70°C < T_{medium} < 230°C	not RCCS30LR to 33; always with /S2 or /Tx; remote cable RCCY033/034 recommended
High temperature version	/HT	T_{medium} up to 350°C	RCCS34 to 39/IR only with /Tx or /S2 (customer insulation required); RCCS39/XR only with /S2; remote cable RCCY033/034 recommended
Special Calibration	/K2 [2]	Custom 5 pts mass-/volume-flow calibration using water with factory certificate (traceable to German national standards)	
	/K4	Density adjustment + thermal treatment; (accuracy: 0.001 g/cm³)	only RCCS31 to 39; not with /GA
	/K5 [2]	Custom 10 pts mass-/volume-flow calibration using water with DKD certificate (according EN-17025:2005)	
	/K6	Density calibration with 3 different fluids incl. individual temperature compensation with certificate (accuracy: 0.0005 g/cm³)	only RCCS32 to 39; not with /GA; not with /LT; not with /MT; only available if converter is also ordered
Certificates	/P2	Certificate of compliance with the order acc. to EN 10204:2004 -2.1	
	/P3	As /P2 + Test report acc to EN 10204: 2004 -2.2 (QIC)	
	/P6	Material certificate acc to EN 10204: 2004 -3.1	
	/P8	Pressure test report measuring system	
	/H1	Oil and fat free for wetted surface acc. to ASTM G93-03 level C	
	/WP	WPS acc. DIN EN ISO 15609-1 (Welding Procedure Specification) WPQR acc. DIN EN ISO 15614-1 (Welder Performance Qualification Record) WQC acc. DIN EN 287-1 (Welder Qualification Certificate)	only for butt weld between process connection and flow divider; not for HC
Sanitary Type	/SF1	Surface roughness Ra = 0.8 µm	only RCCS30LR to 39; not with RCCS34 /K4, RCCS34 /K6 and RCCS34 /LT ; only process connections S2, S4, S8; see also restrictions in table 11
	/SF2	As /SF1 + Test report roughness of wetted parts	
	/SA	As /SF2 + 3A- declaration of conformity and 3A- mark	not with process connection S2
	/SE	As /SF2 + EHEDG- certificate	not with process connection S2
Mounting set	/PD	2 inch pipe mounting set	only RCCS30LR to 33; not with /Tx; recommended for RCCS30LR and RCCS30
Housing Pressure Test	/J1	Rupture pressure proof test and certificate (see page 4)	not for RCCS30LR to 33 + RCCS39/XR
Customer insulation / Heating	/S2	Terminal box on extension for high or low process temperature	not with /T1 ... /T3
Factory Insulating / Heating	/T1	Insulation	not for RCCS39/XR
	/T2	Insulation + Heat carrier heating	not for RCCS39/XR
	/T3	Insulation + Heat carrier heating with ventilation (purge)	not for RCCS39/XR
X-Ray Examination	/RT	X-ray examination of flange welding	RCCS30LR to 33 and RCCS34 with /K4, /K6 or /LT only one-sided; not with HC
PMI Examination	/PM4	PAMI test (4 test points: process connection inlet + outlet, flow divider inlet + outlet) [3]	only RCCS30LR to 33
	/PM6	PAMI test (6 test points: process connection inlet + outlet, measuring tubes, flow divider inlet + outlet) [3]	not RCCS30LR to 33
Dye Penetration Test	/PT	Dye penetration test of flange welding	
Stainless steel cable gland	/BS	Cable gland stainless steel	
Delivery to Japan	/PJ	For meters which are delivered to Japan	
Delivery to Korea	/KC	With KC-mark for Korea	
Quick Delivery	/QD	Delivery within 24 hours from factory	Delivery scope please refer to “Quick Delivery Possibilities” or contact Yokogawa sales office.
Special order	/Z	Special design must be specification an extra sheet	

[1] Select affiliated converter RCCF31/RCCR31 with the same approval type (e.g. ATEX).
[2] Calibration order sheet must be delivered with the order. This is available on the Flow Center Page at Coriolis/RCCx3/Technical Information.
[3] Measuring tube PAMI test is performed per delivery batch.

Remote field-mount Converter RCCF31, Model, Suffix and Option Code

Model	Suffix Code	Option Code	Description	Restrictions
RCCF31			Remote field-mount converter to be connected to RCCS3; when ordered without detector combination option /NC must be selected	
Power supply	-A -D		90 - 264 V AC 24 V DC	
Indicator direction	H2 N0		With indicator Without indicator	
Cable conduit connection	M A		M20 x 1.5, female thread with cable glands ANSI ½´´ NPT, female thread, only cable gland for detector connection	 mandatory with /FF1, /FF2

Hazardous Area Approvals [1]	/KF1 /KF2 /FF1 /FF2 /EF1 /EF2 /UF1 /UF2 /NF1 /NF2	ATEX Flame proof converter + Intrinsic safe detector output ATEX Flame proof converter + Intrinsic safe detector output + Intrinsic safe outputs FM approval for USA+Canada, Flame proof converter + Intrinsic safe detector output + 2 active analog outputs + 2 passive pulse outputs + 1 status input FM approval for USA+Canada, Flame proof converter + Intrinsic safe detector output + 1 passive analog output + 1 passive pulse output IECEx Flame proof converter + Intrinsic safe detector output IECEx Flame proof converter + Intrinsic safe detector output + Intrinsic safe outputs INMETRO Flame proof converter + Intrinsic safe detector INMETRO Flame proof converter + Intrinsic safe detector output + Intrinsic safe outputs NEPSI Flame proof converter + Intrinsic safe detector output NEPSI Flame proof converter + Intrinsic safe detector output + Intrinsic safe outputs	with /HP for gas group IIB with /HP for gas group IIB only with cable conduit ´A´; with /HP not for groups A and B only with cable conduit ´A´; with /HP not for groups A and B with /HP for gas group IIB with /HP for gas group IIB with /HP for gas group IIB with /HP for gas group IIB with /HP for gas group IIB with /HP for gas group IIB
Custody Transfer Measurement acc. OIML R 117-1	/Q01 /Q20	European MID Approval (fluids other than water) (refer to GS 01R04B07-00E) NTEP approval 12-080A1, Accuracy class 0.3 acc. NIST Handbook 44 (refer to GS 01R04B07-00E)	not with /NM Ex-type only with /FF1 or /FF2
GOST [1]	/QR1 /QR2 /QR3	Primary Calibration and Test Confirmation valid in Russia Primary Calibration and Test Confirmation valid in Kazakhstan Primary Calibration and Test Confirmation valid in Uzbekistan	see page 9; not with /Q20 see page 9; not with /Q20 see page 9; not with /Q20
Communication	/MB1	Modbus communication protocol for selected parameters and values	not with /Q01, /Q20, /KF2, /EF2, /UF2, /FF2, /NF2
High Driving Power	/HP	High Driving Power	not for combination with RCCS30LR to 34, recommended for combination with RCCS36 to 39, strongly recommended for combination with RCCS39/IR, mandatory for combination with RCCS39/XR [4] Please see „ Hazardous Area Specifications“
Active Pulse Output	/AP	One active pulse output	not with /KF2, /EF2, /UF2, /NF2, /NM
NAMUR Switch	/NM	One pulse output acc. EN 60947-5-6 (NAMUR)	not with /AP
Tag Number	/BG	With customer specified tag number on name plate	max. 16 digits
HART® Tag Number (Software Tag)	/BT1	With customer specified tag number for HART® communication in converter	8 digits for tag, 22 digits for long tag
Gas Measurement	/GA	Gas measurement, special factory adjustments and settings	select affiliated RCCS3 with /GA; not with /Q20
Combination with RCCS39/XR	/XR	Special converter adjustment with RCCS39/XR	mandatory for combination with RCCS39/XR
No Combination	/NC	No combination with detector	
Customer Presetting	/PS	Presetting sheet with customer data	has to be issued with the order
Epoxy Coating	/X1	Epoxy coating of converter housing	
Delivery to Japan	/PJ	For meters which are delivered to Japan with SI-unit preset	
Delivery to Korea	/KC	With KC-mark for Korea	
Cable glands	/AD2	2 pcs ANSI 1/2“ NPT / G1/2 adapter	only with cable conduit ´A´
Concentration Measurement [2]	/CST /Cxx	Standard concentration measurement Advanced concentration measurement, details see table „Advanced Concentration Measurement Options“	not with /GA not with /GA
Instruction Manuals	/IEn /IDn /IFn	Quantity of instruction manuals in English Quantity of instruction manuals in German Quantity of instruction manuals in French	n = 1 to 3 selectable [3] n = 1 to 3 selectable [3] n = 1 to 3 selectable [3]
Quick Delivery	/QD	Delivery within 24 hours from factory	Delivery scope please refer to “Quick Delivery Possibilities” or contact Yokogawa sales office.
Special order	/Z	Special design must be specification an extra sheet	

[1] Select affiliated RCCS3 with the same approval type (e.g. /KFx with /KS1).
[2] For detailed information please see TI 01R04B04-04E-E. Option /K6 of RCCS3 is recommended with concentration measurement.
[3] If no instruction manual is selected, only a DVD with instruction manuals is shipped with the instrument. More than 3 manuals of one language on request.
[4] RCCF31 in combination with RCCS39/XR with gas application /GA can also be ordered without /HP.

Remote rack-mount Converter RCCR31, Model, Suffix and Option Code

Model	Suffix Code	Option Code	Description	Restrictions
RCCR31			Remote converter for 19´´ rack mounting to be connected to RCCS3	
Power supply	-A -D		90 - 264 V AC 24 V DC	
Hazardous Area Approvals [1]		/KS1 /FS1 /ES1 /US1 /NS1	ATEX associated apparatus for intrinsic safe detector connection for gas group IIC FM associated apparatus for intrinsic safe detector output IECEx associated apparatus for intrinsic safe detector output for gas group IIC INMETRO associated apparatus for intrinsic safe detector output for gas group IIC NEPSI associated apparatus for intrinsic safe detector output for gas group IIC	with /HP for gas group IIB with /HP not for gas groups A and B with /HP for gas group IIB with /HP for gas group IIB with /HP for gas group IIB
GOST [1]		/QR1 /QR2	Primary Calibration and Test Confirmation valid in Russia Primary Calibration and Test Confirmation valid in Kazakhstan	see page 9 see page 9
High Driving Power		/HP	High Driving Power	not for combination with RCCS30LR to 34, recommended for combination with RCCS36 to 39, strongly recommended for combination with RCCS39/IR, mandatory for combination with RCCS39/XR [4] Please see „ Hazardous Area Specifications“
Active Pulse Output		/AP	One active pulse output	not with /NM
NAMUR Switch		/NM	One pulse output acc. EN 60947-5-6 (NAMUR)	not with /AP
Communication		/MB1	Modbus communication protocol for selected parameters and values	
Tag Number		/BG	With customer specified tag number on name plate	max. 16 digits
HART® Tag Number (Software Tag)		/BT1	With customer specified tag number for HART® communication in converter	8 digits for tag, 22 digits for long tag
Gas Measurement		/GA	Gas measurement, special factory adjustments and settings	select affiliated RCCS3 with /GA
Combination with RCCS39/XR		/XR	Special converter adjustment with RCCS39/XR	mandatory for combination with RCCS39/XR
No Combination		/NC	No combination with detector	
Customer Presetting		/PS	Presetting sheet with customer data	has to be issued with the order
Concentration Measurement [2]		/CST /Cxx	Standard concentration measurement Advanced concentration measurement, details see table „Advanced Concentration Measurement Options“	not with /GA not with /GA
Subrack		/SR2 /SR4	Subrack for 2 converter RCCR31 with mounting Subrack for 4 converter RCCR31 with mounting	
Delivery to Korea		/KC	With KC-mark for Korea	
Instruction Manuals		/IEn /IDn /IFn	Quantity of instruction manuals in English Quantity of instruction manuals in German Quantity of instruction manuals in French	n = 1 to 3 selectable [3] n = 1 to 3 selectable [3] n = 1 to 3 selectable [3]
Special order		/Z	Special design must be specification an extra sheet	

[1] Select affiliated RCCS3 with the same approval type (e.g. /KS1 with /KS1).
[2] For detailed information please see TI 01R04B04-04E-E. Option /K6 of RCCS3 is recommended with concentration measurement.
[3] If no instruction manual is selected, only a DVD with instruction manuals is shipped with the instrument. More than 3 manuals of one language on request.
[4] RCCR31 in combination with RCCS39/XR with gas application /GA can also be ordered without /HP.

Remote Cable RCCY03, Model, Suffix and Option Code

Model	Suffix Code	Option Code	Description	Restrictions
RCCY031 RCCY032 RCCY033 RCCY034			Length in ´meter´ Length in ´feet´ Length in ´meter´ Length in ´feet´	max. ambient temperature 70°C; with /FFx or /FS1: 50°C max. ambient temperature 70°C; with /FFx or /FS1: 50°C max. ambient temperature 105°C; with /FFx or /FS1: 85°C max. ambient temperature 105°C; with /FFx or /FS1: 85°C
Cable ends	-0 -1		No termination, with one termination kit Terminated	
Cable length	Lxxx		Enter the length	max. 300m / 999ft (with /FFx or /FS1 max. 50m / 165ft); the following lengths can be ordered (e.g. 3m = L003): RCCY031-0: 3m, 5m, 10m, 15m, 30m, 50m, 100m, 150m, 200m, 250m, 300m RCCY031-1: 3m, 5m, 10m, 15m, 30m, 50m RCCY032-0: 10ft, 15ft, 30ft, 50ft, 100ft, 150ft, 300ft, 500ft, 1000ft RCCY032-1: 10ft, 15ft, 30ft, 50ft, 100ft, 150ft RCCY033-0: 3m, 5m, 10m, 15m, 30m, 50m, 100m, 150m, 300m RCCY033-1: 3m, 5m, 10m, 15m, 30m, 50m RCCY034-0: 10ft, 15ft, 30ft, 50ft, 100ft, 150ft, 300ft, 500ft, 1000ft RCCY034-1: 10ft, 15ft, 30ft, 50ft, 100ft, 150ft
Options: Hazardous area installation Termination kits Quick delivery		 /KS1 /NS1 /TKxx /QD	 Blue cable for Ex-i indication Blue cable for Ex-i indication (China) Quantity of additional termination kits Delivery within 24 hours from factory	 xx = 01 to 99 only RCCY031-1, L003, L005, L010

Advanced Concentration Measurement Options (others on request), recommended with Option /K6

Option	Display	Components	Concentration range	Temp. range	Source of concentration- / density table
/C01	°Brix	Sugar / Water	0 - 85 °Brix	0 - 80°C	PTB- Messages 100 5/90: „The density of watery Saccarose solutions after the introduction of the international temperature scale of 1990 (ITS1990)“ Table 5
/C02	WT%	NaOH / Water	2 - 50 WT%	0 - 100°C	D´Ans-Lax, Handbook for chemists and physicists Vol.1, 3rd edition, 1967
/C03	WT%	KOH / Water	0 - 60 WT%	54 - 100°C	D´Ans-Lax, Handbook for chemists and physicists Vol.1, 3rd edition, 1967
/C04	WT%	NH_4NO_3 / Water	1 - 50 WT%	0 - 80°C	Data table on request
/C05	WT%	NH_4NO_3 / Water	20 - 70 WT%	20 - 100°C	Data table on request
/C06 [1)]	WT%	HCl / Water	22 - 34 WT%	20 - 40°C	D´Ans-Lax, Handbook for chemists and physicists Vol.1, 3rd edition, 1967
/C07	WT%	HNO_3 / Water	50 - 67 WT%	10 - 60°C	Data table on request
/C09	WT%	H_2O_2 / Water	30 - 75 WT%	4 - 44°C	Data table on request
/C10	WT%	Ethylene Glycol / Water	10 - 50 WT%	-20 - 40°C	Data table on request
/C11	WT%	Amylum = starch / Water	33 - 43 WT%	35 - 45°C	Data table on request
/C12	WT%	Methanol / Water	35 - 60 WT%	0 - 40°C	Data table on request
/C20	VOL%	Alcohol / Water	55 - 100 VOL%	10 - 40°C	Data table on request
/C21	°Brix	Sugar / Water	40 - 80 °Brix	75 - 100°C	Data table on request
/C30	WT%	Alcohol / Water	66 - 100 WT%	15 - 40°C	Standard Copersucar 1967
/C37	WT%	Alcohol / Water	66 - 100 WT%	10 - 40°C	Brazilian Standard ABNT
/C38	VOL%	Alcohol / Water	73 - 100 VOL%	10 - 40°C	Brazilian Standard ABNT

[1)] only with material HC

Table 11 : Selection Table Process Connection and Materials, Installation Length (mm)

			RCCS 30LR	RCCS 30-33	RCCS34 RCCT34		RCCS36 RCCT36		RCCS38 RCCT38		RCCS39 RCCT39		RCCS39/IR RCCT39/IR		RCCS39/XR RCCT39/XR	
			SH	SH	SL	HC	SL	HC	SL	HC	SL	HC	SL	HC	SL	HC
Flanges according to ASME B16.5	01A1	½"-150	240	240	370	----	----	----	----	----	----	----	----	----	----	----
	01A2	½"-300	240	240	370	----	----	----	----	----	----	----	----	----	----	----
	01A3	½"-600	250	250	380	----	----	----	----	----	----	----	----	----	----	----
	01A5	½"-900/1500	270	270	400	----	----	----	----	----	----	----	----	----	----	----
	02A1	1"-150	----	240	370	390	500	----	----	----	----	----	----	----	----	----
	02A2	1"-300	----	240	370	390	500	----	----	----	----	----	----	----	----	----
	02A3	1"-600	----	260	390	----	520	----	----	----	----	----	----	----	----	----
	02A5	1"-900/1500	----	320	450	----	540	----	----	----	----	----	----	----	----	----
	04A1	1½"-150	----	250	380	390	500	520	600	----	----	----	----	----	----	----
	04A2	1½"-300	----	250	380	390	510	520	600	----	----	----	----	----	----	----
	04A3	1½"-600	----	270	400	----	530	----	620	----	----	----	----	----	----	----
	04A4	1½"-900	----	----	----	----	----	----	640	----	----	----	----	----	----	----
	04A5	1½"-900/1500	----	340	450	----	600	----	----	----	----	----	----	----	----	----
	05A1	2"-150	----	----	----	----	510	520	600	620	----	----	----	----	----	----
	05A2	2"-300	----	----	----	----	510	520	600	620	----	----	----	----	----	----
	05A3	2"-600	----	----	----	----	540	----	630	----	----	----	----	----	----	----
	05A4	2"-900	----	----	----	----	----	----	720	----	----	----	----	----	----	----
	05A5	2"-900/1500	----	----	----	----	660	----	----	----	----	----	----	----	----	----
	06A1	2½"-150	----	----	----	----	----	----	610	620	----	----	----	----	----	----
	06A2	2½"-300	----	----	----	----	----	----	610	620	----	----	----	----	----	----
	06A3	2½"-600	----	----	----	----	----	----	640	----	----	----	----	----	----	----
	06A4	2½"-900	----	----	----	----	----	----	760	----	----	----	----	----	----	----
	08A1	3"-150	----	----	----	----	----	----	610	620	1000	1020	----	----	----	----
	08A2	3"-300	----	----	----	----	----	----	620	620	1000	1020	----	----	----	----
	08A3	3"-600	----	----	----	----	----	----	640	----	1000	----	----	----	----	----
	08A4	3"-900	----	----	----	----	----	----	760	----	----	----	----	----	----	----
	10A1	4"-150	----	----	----	----	----	----	----	----	1000	1020	1100	----	----	----
	10A2	4"-300	----	----	----	----	----	----	----	----	1000	1020	1100	----	----	----
	10A3	4"-600	----	----	----	----	----	----	----	----	1030	----	1100	----	----	----
	12A1	5"-150	----	----	----	----	----	----	----	----	1000	1020	1100	1100	----	----
	12A2	5"-300	----	----	----	----	----	----	----	----	1000	1020	1100	1100	----	----
	12A3	5"-600	----	----	----	----	----	----	----	----	1040	----	1160	----	----	----
	15A1	6"-150	----	----	----	----	----	----	----	----	----	----	1100	1100	1350	----
	15A2	6"-300	----	----	----	----	----	----	----	----	----	----	1100	1100	1350	----
	15A3	6"-600	----	----	----	----	----	----	----	----	----	----	1200	----	----	----
	20A1	8"-150	----	----	----	----	----	----	----	----	----	----	----	----	1350	----
	20A2	8"-300	----	----	----	----	----	----	----	----	----	----	----	----	1350	----
Flanges according to EN 1092-1	01D4	DN 15 PN 40	240	240	370	----	----	----	----	----	----	----	----	----	----	----
	01D6	DN 15 PN 100	250	250	380	----	----	----	----	----	----	----	----	----	----	----
	02D4	DN 25 PN 40	----	240	370	390	500	520	----	----	----	----	----	----	----	----
	02D6	DN 25 PN 100	----	260	390	----	520	----	----	----	----	----	----	----	----	----
	04D4	DN 40 PN 40	----	240	370	390	500	520	600	----	----	----	----	----	----	----
	04D6	DN 40 PN 100	----	320	450	----	560	----	620	----	----	----	----	----	----	----
	05D4	DN 50 PN 40	----	----	----	----	500	520	600	620	----	----	----	----	----	----
	05D5	DN 50 PN 63	----	----	----	----	520	----	620	620	----	----	----	----	----	----
	05D6	DN 50 PN 100	----	----	----	----	590	----	660	----	----	----	----	----	----	----
	08D4	DN 80 PN 40	----	----	----	----	----	----	610	620	1000	1020	----	----	----	----
	08D5	DN 80 PN 63	----	----	----	----	----	----	620	----	1000	----	----	----	----	----
	08D6	DN 80 PN 100	----	----	----	----	----	----	730	----	1000	----	----	----	----	----
	10D2	DN 100 PN 16	----	----	----	----	----	----	----	----	----	----	1100	----	----	----
	10D4	DN 100 PN 40	----	----	----	----	----	----	----	----	1000	1020	1100	----	----	----
	10D5	DN 100 PN 63	----	----	----	----	----	----	----	----	1000	----	1100	----	----	----
	10D6	DN 100 PN 100	----	----	----	----	----	----	----	----	1050	----	1100	----	----	----
	12D2	DN 125 PN 16	----	----	----	----	----	----	----	----	----	----	1100	1100	----	----
	12D4	DN 125 PN 40	----	----	----	----	----	----	----	----	1000	1020	1100	1100	----	----
	12D5	DN 125 PN 63	----	----	----	----	----	----	----	----	1000	----	1100	----	----	----
	12D6	DN 125 PN 100	----	----	----	----	----	----	----	----	1100	----	1140	----	----	----
	15D2	DN 150 PN 16	----	----	----	----	----	----	----	----	----	----	1100	1100	1350	----
	15D4	DN 150 PN 40	----	----	----	----	----	----	----	----	----	----	1100	1100	1350	----
	15D5	DN 150 PN 63	----	----	----	----	----	----	----	----	----	----	1140	----	----	----
	15D6	DN 150 PN 100	----	----	----	----	----	----	----	----	----	----	1180	----	----	----
	20D2	DN 200 PN 16	----	----	----	----	----	----	----	----	----	----	----	----	1350	----
	20D4	DN 200 PN 40	----	----	----	----	----	----	----	----	----	----	----	----	1350	----

Table 11 : Selection Table Process Connection and Materials, Installation Length (continued)

			RCCS 30LR	RCCS 30-33	RCCS34 RCCT34		RCCS36 RCCT36		RCCS38 RCCT38		RCCS39 RCCT39		RCCS39 RCCT39/IR		RCCS39 RCCT39/XR	
			SH	SH	SL	HC	SL	HC	SL	HC	SL	HC	SL	HC	SL	HC
Flanges according to JIS B 2220	01J1	DN 15 10K	240	240	370	----	----	----	----	----	----	----	----	----	----	----
	01J2	DN 15 20K	240	240	370	----	----	----	----	----	----	----	----	----	----	----
	02J1	DN 25 10K	----	240	370	390	500	----	----	----	----	----	----	----	----	----
	02J2	DN 25 20K	----	240	370	390	500	----	----	----	----	----	----	----	----	----
	04J1	DN 40 10K	----	240	370	390	500	520	600	----	----	----	----	----	----	----
	04J2	DN 40 20K	----	240	370	390	500	520	600	----	----	----	----	----	----	----
	05J1	DN 50 10K	----	----	----	----	500	520	600	620	----	----	----	----	----	----
	05J2	DN 50 20K	----	----	----	----	500	520	600	620	----	----	----	----	----	----
	08J1	DN 80 10K	----	----	----	----	----	----	600	620	1000	1020	----	----	----	----
	08J2	DN 80 20K	----	----	----	----	----	----	610	620	1000	1020	----	----	----	----
	10J1	DN 100 10K	----	----	----	----	----	----	----	----	1000	1020	1100	----	----	----
	10J2	DN 100 20K	----	----	----	----	----	----	----	----	1000	1020	1100	----	----	----
	12J1	DN 125 10K	----	----	----	----	----	----	----	----	1000	1020	1100	1100	----	----
	12J2	DN 125 20K	----	----	----	----	----	----	----	----	1000	1020	1100	1100	----	----
	15J1	DN 150 10K	----	----	----	----	----	----	----	----	----	----	1100	1100	----	----
	15J2	DN 150 20K	----	----	----	----	----	----	----	----	----	----	1100	1100	----	----
Clamp DIN	01S4	DN 15	240 [2]	240 [2]	----	----	----	----	----	----	----	----	----	----	----	----
	02S4	DN 25	----	240 [2]	370 [2]	----	----	----	----	----	----	----	----	----	----	----
	04S4	DN 40	----	240 [2]	370 [2]	----	500	----	----	----	----	----	----	----	----	----
	05S4	DN 50	----	----	----	----	500	----	600	----	----	----	----	----	----	----
	06S4	DN 65	----	----	----	----	----	----	600	----	----	----	----	----	----	----
	10S4	DN 100	----	----	----	----	----	----	----	----	1000	----	----	----	----	----
Tri-Clamp	01S8	½“	240 [2]	240 [2]	----	----	----	----	----	----	----	----	----	----	----	----
	02S8	1“	----	240 [2]	370 [1] [2]	----	----	----	----	----	----	----	----	----	----	----
	04S8	1½“	----	240 [2]	370 [2]	----	500	----	----	----	----	----	----	----	----	----
	05S8	2“	----	----	----	----	500	----	600	----	----	----	----	----	----	----
	08S8	3“	----	----	----	----	----	----	600	----	----	----	----	----	----	----
	10S8	4“	----	----	----	----	----	----	----	----	1000	----	----	----	----	----
DIN11851	02S2	DN 25	----	240	370	----	----	----	----	----	----	----	----	----	----	----
	04S2	DN 40	----	----	----	----	500	----	----	----	----	----	----	----	----	----
	05S2	DN 50	----	----	----	----	----	----	600	----	----	----	----	----	----	----
	10S2	DN 100	----	----	----	----	----	----	----	----	1000	----	----	----	----	----
Thread	41G9	G¼“ female	260	260	----	----	----	----	----	----	----	----	----	----	----	----
	01G9	G½“ female	260	260	390	----	----	----	----	----	----	----	----	----	----	----
	23G9	G¾“ female	260	260	390	----	----	----	----	----	----	----	----	----	----	----
	41T9	NPT¼“ female	260	260	----	----	----	----	----	----	----	----	----	----	----	----
	01T9	NPT½“ female	260	260	390	----	----	----	----	----	----	----	----	----	----	----
	23T9	NPT¾“ female	260	260	390	----	----	----	----	----	----	----	----	----	----	----

[1] Not possible with Option /SFx, /SA, /SE
[2] Option /SFx, /SA, /SE not possible with /K4, /K6 and /LT

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