General Specifications

ROTA*MASS* 3 Series
Coriolis Mass Flowmeter

GS 01R04B04-00E-E

RCCT39/XR

RCCT34-39/IR

RCCF31 + RCCS34-39/IR

RCCF31 + RCCS30-33

RCCR31

CONTENTS

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 flowing materials including multi phase fluids, high viscosity liquids (pastes and slurries) and liquid witha 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 flow meter 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 +/- 1 g/l
- 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, GOST K, etc.)
- 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)
- Optional intrinsically safe outputs
- Choice of tube materials
- EN, ASME or JIS flanges as standard
- Other process connections on request

YOKOGAWA

Rota Yokogawa GmbH & Co. KG
Rheinstr. 8
D-79664 Wehr
Germany

GS 01R04B04-00E-E

8th edition, Dec. 2007 (Rü)

PERFORMANCE SPECIFICATIONS

Model

- Remote detector RCCS30 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	RCCS31	RCCS32	RCCS33
Qmax	t/h	0.1	0.3	0.6	1.5
Qnom	t/h	0.045	0.17	0.37	0.9

T1a.EPS

Type		RCCS34 RCCT34	RCCS36 RCCT36	RCCS38 RCCT38	RCCS39 RCCT39	RCCS/T 39 /IR	RCCS/T 39 /XR
Qmax	t/h	5	15	50	120	300	600
Qnom	t/h	2.7	9	32	85	250	500

T1b.EPS

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

Accuracy **:**

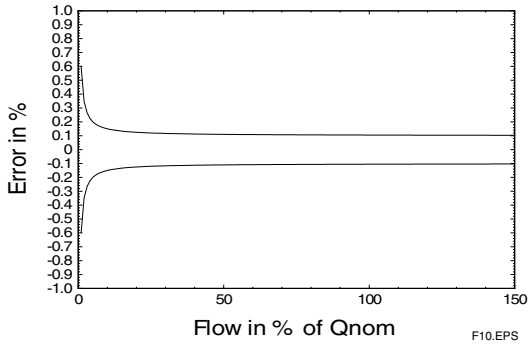
Liquid : ± 0.1% of measured value
± zero stability (refer to table 2)

Gas (option /GA) : ± 0.5% of measured value
± zero stability (refer to table 2)

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

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

Batch process : above specified accuracy if the batch process is >1min. For shorter batch time (dt in s) the accuracy decreases with the square root of 60/dt



F10.EPS

Table 2 : Zero Stability

Type	RCCS30	RCCS31	RCCS32	RCCS33
kg/h	0.0025	0.0085	0.019	0.045

T2a.EPS

Type	RCCS34 RCCT34	RCCS36 RCCT36	RCCS38 RCCT38	RCCS39 RCCT39	RCCS/T 39 /IR	RCCS/T 39 /XR
kg/h	0.135	0.45	1.6	4.3	13	25

T2b.EPS

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.
RCCS30-RCCS34 : no relevant pressure effect

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

Type		RCCS36 RCCT36	RCCS38 RCCT38	RCCS39 RCCT39	RCCS/T 39 /IR	RCCS/T 39 /XR
% of rate per bar	SS	-0.0033	-0.0085	-0.009	-0.0456	-0.0169
	HC	-0.0049	-0.0126	-0.0133	-0.0675	- - - -

T3.EPS

Density measurement

Measuring range : 0.3 kg/l to 5 kg/l (RCCx39, RCCx39/IR and RCCx39/XR to 2 kg/l)
No density measurement for gas application
Accuracy (at calibration conditions)

- RCCS30 : ± 8 g/l
- RCCS31-33 : ± 4 g/l
- RCCS/T34 : ± 3 g/l
- RCCS/T36 : ± 2.2 g/l
- RCCS/T38-39/XR : ± 1.5 g/l
- RCCS/T34-39 : ± 1 g/l (with special calibration option /K3)
- RCCS30-33 : ± 2 g/l (with special calibration option /K3, good thermal insulation of the detector or fixed temperature)

Repeatability

- RCCS32-33, RCCS/T34-39/XR : ± 0.33 g/l

Temperature measurement

Temperature measuring range of converter :
Standard and with /MT : -200°C to 230°C
With /HT : 0°C to 400°C
Accuracy -100°C to 230°C : ± 0.5°C ± 0.5% of reading
Accuracy others : ± 1°C ± 0.8% of reading
For process temperatures more than 80°C higher/lower than ambient temperature the detector should be insulated to maintain optimum accuracy.

Heating 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 p. 17):
for D-type flanges : EN DN15 PN40 Form B1
for A-type flanges : ANSI ½ - 150 lbs.
for J-type flanges : JIS DN15 10K
Max. pressure : PN40
Protection class : IP54, install roof protected
For fluid temperatures below 0°C ask for special insulation (see also page 12).

Calibration for liquids and gases :

The ROTAMASS flow meters are 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

For gas applications please choose option /GA.
All specifications are based on above mentioned calibration reference conditions, a flow calibration protocol is attached to each instrument.

Special calibrations
- Mass flow with factory certificate (option /K2):
  Check at customer specified flow values acc. calibration order sheet
- Mass flow with DKD certificate (option /K5):
  Calibration certificate of the DKD calibration laboratory of ROTA YOKOGAWA as part of the European Cooperation for Accreditation EA)

NORMAL OPERATING CONDITIONS

Ambient temperature limits
- Remote detector RCCS3 :
  Standard : -50°C to +80°C
  Option /HT : -50°C to +65°C
  (up to 280°C medium temp.)
  -50°C to +55°C
  (up to 350°C medium temp.)
  terminal box lower 100°C
- Remote converter RCCF31, RCCR31 and Integral type RCCT3:
  Display work. range : -20°C to +55°C
  Electronic work. 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% R.H.

Process temperature limits

Detector :
- RCCS30 to 33 : -50°C to 150°C
- RCCS34 to 39/XR : -180°C to 150°C
- RCCS34 to 39/XR /MT : -180°C to 230°C
  (Range 150°C – 230°C recommended with /Tx option)
- RCCS34 to 39/IR /HT : 0°C to 350°C (only with /Tx option)
- On request : -200°C to 150°C

Integral type :
- RCCT34 to 39/XR : -40°C to 150°C

Heat carrier fluid temperature limits
(option /T2 or /T3 only for remote type RCCS30 to 39/IR)
- Standard : 0°C to 150°C
- With option /MT : 0°C to 230°C
- With option /HT : 0°C to 350°C

For temperature fluids below 0°C ask for special insulation (see also page 11).

Process pressure limits
According to the flange ratings:
- EN PN 16 : max 16 bar
- EN PN 40 : max 40 bar
- EN PN 63 : max 63 bar
- EN PN 100 : max 100 bar
- ASME class 150 : max 16 bar
- ASME class 300 : max 41 bar
- ASME class 600 : max 83 bar
- ASME class 900 : max 124 bar
- ASME class 1500 : max 207 bar
- JIS 10K : max. 14 bar (1.4 MPa)
- JIS 20K : max. 34 bar (3.4 MPa)

The RCCS30 to RCCS34 have also thread connection. For this connections the max. allowed tube pressure is the limitation. For all other standard process connection please find the max. process pressure in table 7.

Maximum tube pressure for SL/SH up to 27°C (RT=Room Temp.):
- RCCS30 / 31 / 32 : 285 bar
- RCCS33 : 185 bar
- RCCS34 / RCCT34 : 260 bar
- RCCS36 / RCCT36 : 210 bar
- RCCS38 / RCCT38 : 175 bar
- RCCS39 / RCCT39 : 135 bar
- RCCS39/IR / RCCT39/IR : 110 bar
- RCCS39/XR / RCCT39/XR: 95 bar

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 7) or tubes. The maximum temperature and process pressure limits of an instrument are marked on the name-plate as TS and PS.

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 (frequency 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 Qnom and water/air without /HP:
- RCCS32 to 33 : no limitation
- RCCS/T34 : no limitation
- RCCS/T36 : approx. 50%
- RCCS/T38 : approx. 30%
- RCCS/T39 : approx. 7%
- RCCS/T39/IR : approx. 3%
- RCCS/T39/XR : approx. 2% (with option /HP)

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.

Secondary containment
Rupture pressure for RCCS/T34-38 is typical above 120bar, for RCCS/T39 above 80 bar, for RCCS/T39IR above 50bar. 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 at the pressure where deformation does not happen. The housings of the sizes RCCS30-33 and RCCx39/XR can not withstand overpressure.

2 phase flow, liquid/solid and liquid/liquid
2 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.

Power supply and power consumption
- AC-type : 90 to 264 V AC, 47-63 Hz
  For Ex version 250 V AC max.
- DC-type : 20.5 to 28.8 V DC

Consumption : max. 25VA / 10W

MECHANICAL SPECIFICATIONS

Protection class
- RCCT3x, RCCS3x, RCCF31 : IP67
- RCCR31 : IP20

Materials
- Detector housing : Stainless steel 304/1.4301
- Detector terminal box : 316L/1.4404
- Field- mount converter housing : Aluminium alloy with Polyurethane corrosion-resistant coating or epoxy coating (option /X1)
- Rack- mount converter housing : Aluminium

Coating colour
- Field-mount converter case : Mint green

Wetted parts
- RCCS30 to 33 :
  Tubes : HC-22/2.4602
  Process connections : 316L/1.4404
- RCCx34 to 39/IR :
  Tubes and process connection : 316L/1.4404 or Hastelloy C-22/2.4602
- RCCx39/XR :
  Tubes and process connection : 316L/1.4404

Table 4 : Diameter of measuring tubes

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

T5a.EPS

Type		RCCS34 RCCT34	RCCS36 RCCT36	RCCS38 RCCT38	RCCS39 RCCT39	RCCS39/IR RCCT39/IR	RCCS39/XR RCCT39/XR
Inner diameter	mm	7.6	13.4	22.1	37.2	55.1	82.5
Wall thickness	mm	0.91	1.24	1.65	2.6	2.6	3.2

T5b.EPS

PRESSURE EQUIPMENT DIRECTIVE 97/23/EC
- Module : H; Fluid group : 1; Category : III
RCCx34-RCCx38 : Fluid group 2, SEP
RCCx39-RCCx39/XR : Fluid group 2, Cat. I

FOR ASME FLANGES : CRN 0F10715.5

ELECTRICAL SPECIFICATIONS

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

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 current outputs:
  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 to100% of Qnom
  Setting range URV for gases: 1 to 100% of Qnom
- Two Pulse outputs / status outputs :
  passive Transistor contact output , 30 V DC, 200mA
  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, 12V,6 mA,R_L> 10 kΩ
  Active pulse output is not isolated from current output 2
  As frequency output :
  Output 1 : 20Hz to10000Hz
  Output 2 : 20Hz to 2000Hz
- Status input : Voltage-free contact
  Closed : < 200Ω
  Open : > 100 kΩ

Intrinsic safe outputs (/KF2), a total of 2 outputs
- One passive current output (additional power supply needed) :
  4 to 20 mA DC, galvanic separated from other signals.
  Supply voltage 10.5V to 30V DC(without HART), 165mA
  Supply voltage 16.75V to 30V DC (with HART), 165mA.
  Load resistance : 20Ω ... 600Ω
  Ambient temperature effect : < 0.05% of span/10°C
- One pulse output / status output :
  passive Transistor contact output, 30 V DC, 100 mA
  Output rate : 0 to 2000 pulses/s
  As frequency output : 20Hz to 2000Hz
  Option /NM : passive, according EN 60947-5-6

Digital communication
- HART communication signal, superimposed on 4 -20 mA DC signal (Iout1)
- Load resistance : 230Ω 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

Setting functions
Parameter setting is possible by using the switches on the display or with HART communication.

Display function
- Up to 4 lines.
- 3 languages selectable (English, German, French)
- Instantaneous flow rate, density, temperature or totalized flow can be displayed.

Damping functions
Settable from 0.1 seconds (63% response time) 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 (2000A) are inside converter for power supply lines.

REMOTE CABLE RCCY03 SPECIFICATION

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

Model code	Temperature range	Wire gauge	Resistance of loop	Capacitance wire/wire	Capacitance wire/shield	Inductance wire/wire
RCCY031/32	-50 to +70 °C	AWG 24	190 Ω/km	157 nF/km	249 nF/km	0.6 mH/km
		AWG 20	70 Ω/km	193 nF/km	290 nF/km	0.65 mH/km
RCCY031/32 /KS1	-50 to +70 °C	AWG 24	190 Ω/km	157 nF/km	249 nF/km	0.6 mH/km
		AWG 20	70 Ω/km	193 nF/km	290 nF/km	0.65 mH/km
RCCY033/34	-30 to +105 °C	AWG 24	177 Ω/km	175 nF/km	350 nF/km	0.8 mH/km
		AWG 20	70 Ω/km	145 nF/km	290 nF/km	0.7 mH/km
RCCY033/34 /KS1	-30 to +105 °C	AWG 24	180 Ω/km	190 nF/km	118 nF/km	0.6 mH/km

AWG 20 wires are used for temperature measurement circuit.

HAZARDOUS AREA SPECIFICATIONS

ATEX

Remote detector RCCS30 ... 39/XR (option /KS1):
- KEMA 01ATEX 1075 X
- Intrinsically safe
- II 2G Ex ib IIB/IIC T1 ... T6
- II 2D Ex ibD 21 IP6x Txxx (xxx = max. surface temperature see below)
- Max. surface temperature :
  - Standard : 150°C
  - /MT : 220°C
  - /HT : 350°C
- Degree of protection : IP67
- Ambient humidity : 0 to 95% RH
- Ambient temperature range
  - Standard 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 /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 T70°C
- Max. surface temperature : 70°C
- Degree of protection : IP67
- Power supply : 90 to 250V AC, 50/60 Hz or 20.5 to 28.8V DC
- Power consumption : max. 25VA / 10W
- Ambient humidity : 0 to 95% RH
- Ambient temperature range : -20°C to +50°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 T70°C
- Max. surface temperature : 70°C
- Degree of protection : IP67
- Power supply : 90 to 250V AC, 50/60 Hz or 20.5 to 28.8V DC
- Power consumption : max. 25VA / 10W
- Ambient humidity : 0 to 95% RH
- Ambient temperature range : -20°C to +50°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 250V AC, 50/60 Hz or 20.5 to 28.8V DC
- Power consumption : max. 25VA / 10W
- Ambient humidity : 0 to 95% RH
- Ambient temperature range : -20°C to +50°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 28.8V DC
- Power consumption : max. 25VA / 10W
- Ambient humidity : 0 to 95% RH
- Ambient temperature range : –20°C to +50°C

Integral type RCCT34 ... 39/XR (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 ... 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. 25VA / 10W
- Ambient humidity : 0 to 95% RH
- Ambient temperature range : –20°C to +50°C

Electrical data Remote detector RCCS30 ... 33 :
- Driving circuit : terminals D+ and D
  - Ex ib IIC : Ui = 16 V; Ii = 53 mA; Pi = 0.212 W; Li = 4.2mH; Ci = negligible small
  - Ex ib IIB : Ui = 16 V; Ii = 153 mA; Pi = 0.612 W; Li = 4.2mH; Ci = negligible small
- Sensor circuits: terminals S1+ and S1- or S2+ and S2-
  - Ex ib IIC : Ui = 16V; Ii = 80mA; Pi = 0.32 W; Li = 4.2mH; Ci = negligible small
- Temperature sensor circuit : terminals TP1, TP2, TP3
  - Ex ib IIC : Ui = 16V; Ii = 50mA; 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 = 3.2mH; Ci = negligible small
  - Ex ib IIB : 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-
  - Ex ib IIC : Ui = 16V; Ii = 80mA; Pi = 0.32 W; Li = 2.1mH; Ci = negligible small
- Temperature sensor circuit : terminals TP1, TP2, TP3
  - Ex ib IIC : Ui = 16V; Ii =50mA; 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 = 15mH; Co = 0.65µF
  - Ex [ib] IIB : Uo = 11.7 V; Io = 124 mA; Po = 0.363 W; Lo = 8mH; Co = 10.3µF
- Sensor circuits: terminals S1+/ S1- or S2+ / S2-
  - Ex [ib] IIB/IIC :Uo = 14.5V; Io = 47mA; Po = 0.171 W
  - Ex [ib] IIC : Lo = 15mH; Co = 0.65µF
  - Ex [ib] IIB : Lo = 60mH; Co = 4.07µF

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

Temperature classification see table 5.

INMETRO APPROVAL (For Brazil)

RCCS3x with option /US1.
RCCT3x with options /UF1 ... /UF2 same as ATEX /KF1 ... /KF2
RCCF31 with options /UF1 ... /UF2 same as ATEX /KF1 ... /KF2
RCCR31 with option /US1 same as ATEX /KS1
Same parameters and specifications as ATEX approval.

FM (For USA and Canada)

Remote detector RCCS30 ... 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

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

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

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

Process 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

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 = 14.5V; Io = 47mA; Po = 0.363 W
  Lo = 15 mH; Co = 0.65 µF
- Temperature sensor circuit : terminals TP1,TP2, TP3
  Uo = 13.3V; Io =40mA; Po = 0.133 W
  Lo = 20 mH; Co =0.91 µF

Electrical data Remote detector RCCS30 ... 33 :
- Driving circuit : terminals D+ and D
  Groups A-D: Ui = 16 V; Ii = 53 mA; Pi = 0.212 W
  Li = 4.2mH; Ci = negligible small
  Groups C,D: Ui = 16 V; Ii = 153 mA; Pi = 0.612 W
  Li = 4.2mH; Ci = negligible small
- Sensor circuits: terminals S1+ and S1- or S2+ and S2-
  Ui = 16V; Ii = 80mA; Pi = 0.32 W
  Li = 4.2mH; Ci = negligible small
- Temperature sensor circuit : terminals TP1, TP2, TP3
  Ui = 16V; Ii =50mA; 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 = 16V; Ii = 80mA; Pi = 0.32 W
  Li = 2.1mH; Ci = negligible small
- Temperature sensor circuit : terminals TP1, TP2, TP3
  Ui = 16V; Ii =50mA; 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 avalable 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.

GOST APPROVAL

Rota Yokogawa has the “Pattern Approval Certificate of Measuring Instruments” which allows to export the instrument to Russia, Kazachstan and other CIS countries. Furthermore Rotamass is RTN (GGTN) approved for installation in hazardous areas. For the export of Rotamass to CIS countries please contact your Yokogawa representative

IECEx APPROVAL

Certificate: IECEx KEM 06.0031X

Remote detector RCCS30 ... 39/XR (option /ES1):
- Intrinsically safe
- II 2G Ex ib IIB/IIC T6
- Standard : Ex ibD 21 IP6x T150°C
  Option /MT : Ex ibD 21 IP6x T220°C
  Option /HT : Ex ibD 21 IP6x T350°C
- Max. surface temperature :
  Standard : 150°C
  /MT : 220°C
  /HT : 350°C
- Degree of protection : IP67
- Ambient humidity : 0 to 95% RH
- Ambient temperature range
  Standard 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 /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 T70°C
- Max. surface temperature : 70°C
- Degree of protection : IP67
- Power supply : 90 to 250V AC, 50/60 Hz or
  20.5 to 28.8V DC
- Power consumption : max. 25VA / 10W
- Ambient humidity : 0 to 95% RH
- Ambient temperature range : -20°C to +50°C

Remote converter RCCF31 (option /EF2) :
- KEMA 02ATEX 2183 X
- 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 T70°C
- Max. surface temperature : 70°C
- Degree of protection : IP67
- Power supply : 90 to 250V AC, 50/60 Hz or
  20.5 to 28.8V DC
- Power consumption : max. 25VA / 10W
- Ambient humidity : 0 to 95% RH
- Ambient temperature range : -20°C to +50°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 250V AC, 50/60 Hz or
  20.5 to 28.8V DC
- Power consumption : max. 25VA / 10W
- Ambient humidity : 0 to 95% RH
- Ambient temperature range : -20°C to +50°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 250V AC, 50/60 Hz or
  20.5 to 28.8V DC
- Power consumption : max. 25VA / 10W
- Ambient humidity : 0 to 95% RH
- Ambient temperature range : –20°C to +50°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 250V AC, 50/60 Hz or
  20.5 to 28.8V DC
- Power consumption : max. 25VA / 10W
- Ambient humidity : 0 to 95% RH
- Ambient temperature range : –20°C to +50°C

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 = 15mH; Co = 0.65µF
  Ex [ib] IIB : Uo = 11.7 V; Io = 124 mA; Po = 0.363 W
  Lo = 8mH; Co = 10.3µF
- Sensor circuits: terminals S1+/ S1- or S2+ / S2-
  Ex [ib] IIB/IIC : Uo = 14.5V; Io = 47mA; Po = 0.171 W
  Ex [ib] IIC : Lo = 15mH; Co = 0.65µF
  Ex [ib] IIB : Lo = 60mH; Co = 4.07µF
- Temperature sensor circuit : terminals TP1, TP2, TP3
  Ex [ib] IIB/IIC : Uo = 13.3V; Io =40mA; Po = 0.133 W
  Ex [ib] IIC : Lo = 20mH; Co =0.91µF
  Ex [ib] IIB : Lo = 80mH; Co =5.6µF
- Current output (only option /KF2) :
  Ex [ia] IIC : Ui = 30 V; Ii = 165 mA; Pi = 1.25 W
  Li = negligible small; Ci = 6.9nF
- Pulse output (only option /KF2) :
  Ex [ia] IIC : Ui = 30 V; Ii = 100 mA; Pi = 0.75 W
  Li = negligible small; Ci = 4.5nF

Electrical data Remote detector RCCS30 ... 33:

- Driving circuit : terminals D+ / D-
  Ex ib IIC : Ui = 16 V; Ii = 53 mA; Pi = 0.212 W
  Li = 4.2mH; Ci = negligible small
  Ex ib IIB : Ui = 16 V; Ii = 153 mA; Pi = 0.612 W
  Li = 4.2mH; Ci = negligible small
- Sensor circuits: terminals S1+/ S1- or S2+ / S2-
  Ex ib IIC : Ui = 16V; Ii = 80mA; Pi = 0.32 W
  Li = 4.2mH; Ci = negligible small
- Temperature sensor circuit : terminals TP1,TP2,TP3
  Ex ib IIC : Ui = 16V; Ii = 50mA; 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 = 3.2mH; Ci = negligible small
  Ex ib IIB : Ui = 16 V; Ii = 153 mA; Pi = 0.612 W
  Li = 3.2mH; Ci = negligible small
- Sensor circuits: terminals S1+/ S1- or S2+ / S2-
  Ex ib IIC : Ui = 16V; Ii = 80mA; Pi = 0.32 W
  Li = 2.1mH; Ci = negligible small
- Temperature sensor circuit : terminals TP1,TP2,TP3
  Ex ib IIC : Ui = 16V; Ii = 50mA; Pi = 0.2 W
  Li = negligible small;
  Ci = negligible small

Table 5 : Temperature classification for ATEX,FM, IECEx and INMETRO certified flowmeters

	RCCS30 to RCCS33		RCCS34 to RCCS39/XR without insulation		RCCS34 to RCCS39/IR with factory insulation /T1.../T3		RCCT34 to RCCT39/XR	
Temp. class	Max. ambient temperature	Max. medium temperature	Max. ambient temperature	Max. medium temperature / temperature of heat carrier	Max. ambient temperature	Max. medium temperature / temperature of heat carrier	Max. ambient temperature	Max. medium temperature
T6	≤ 50°C / 122°F	≤ 60°C / 140°F	≤ 40°C / 104°F	≤ 40°C / 104°F	≤ 65°C / 149°F	≤ 65°C / 149°F	≤ 50°C / 122°F	≤ 65°C / 149°F
T5	≤ 50°C / 122°F	≤ 80°C / 176°F	≤ 55°C / 131°F	≤ 55°C / 131°F	≤ 75°C / 167°F	≤ 75°C / 167°F	≤ 50°C / 122°F	≤ 80°C / 176°F
T4	≤ 80°C / 176°F ≤ 50°C / 122°F	≤ 100°C / 212°F ≤ 120°C / 248°F	≤ 80°C / 176°F ≤ 40°C / 104°F	≤ 100°C / 212°F ≤ 120°C / 248°F	≤ 70°C / 158°F	≤ 115°C / 239°F	≤ 50°C / 122°F	≤ 115°C / 239°F
T3	≤ 80°C / 176°F	≤ 150°C / 302°F	≤ 80°C / 176°F ≤ 40°C / 104°F	≤ 160°C / 320°F ≤ 180°C / 356°F	≤ 70°C / 158°F	≤ 180°C / 356°F	≤ 50°C / 122°F	≤ 150°C / 302°F
T2	≤ 80°C / 176°F	≤ 150°C / 302°F	≤ 80°C / 176°F	≤ 220°C / 428°F	≤ 65°C / 149°F	≤ 275°C / 527°F		
T1					≤ 45°C / 113°F	≤ 350°C / 662°F		

T4.EPS

For customer insulation of RCCS34 to 39/XR see instruction manual.

PRESSURE LOSS

Pressure loss depends on velocity, viscosity and density of the fluid. For newtonian fluids the pressure loss is shown in table 6 (1kg/l, 1mPas) and figures 1 to 10.

Table 6 : Pressure loss

Type		RCCS30	RCCS31	RCCS32	RCCS33	RCCS34 RCCT34
Qmax	bar	4.45	2.72	2.34	2.5	2.5
Qnom	bar	1.11	0.97	1.0	1.01	0.98

T6a.EPS

Type		RCCS36 RCCT36	RCCS38 RCCT38	RCCS39 RCCT39	RCCS39/IR RCCT39/IR	RCCS39/XR RCCT39/XR
Qmax	bar	3.01	3.58	2.35	1.40	1.42
Qnom	bar	0.95	0.97	0.98	1.00	1.04

T6b.EPS

NOTE :
- Figures 1 to 10 show the pressure loss for newtonian fluids, density is 1kg/l, viscosity as shown.
- The pressure losses are valid for constant flows. Pulsating flow causes a considerably higher pressure loss on average.

Fig.1: Pressure loss RCCS30

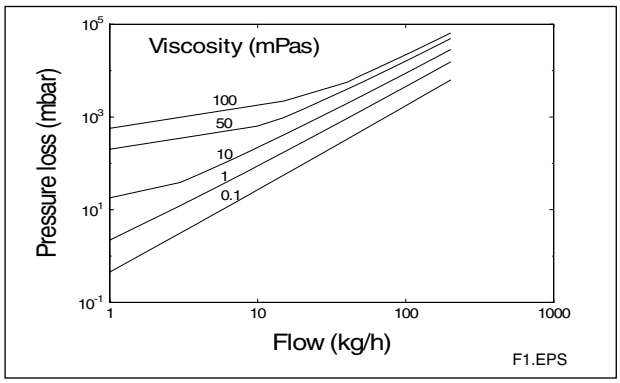


Fig.2: Pressure loss RCCS31

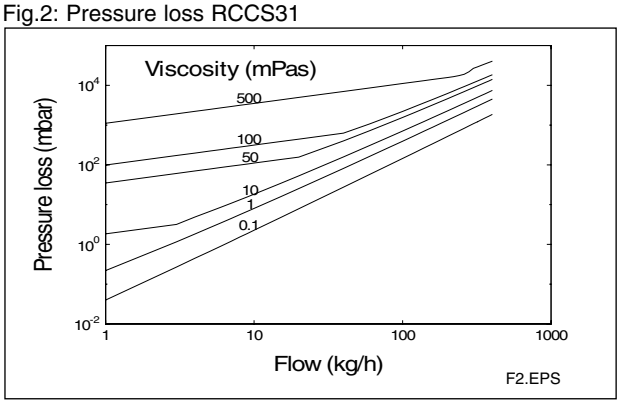


Fig.3: Pressure loss RCCS32

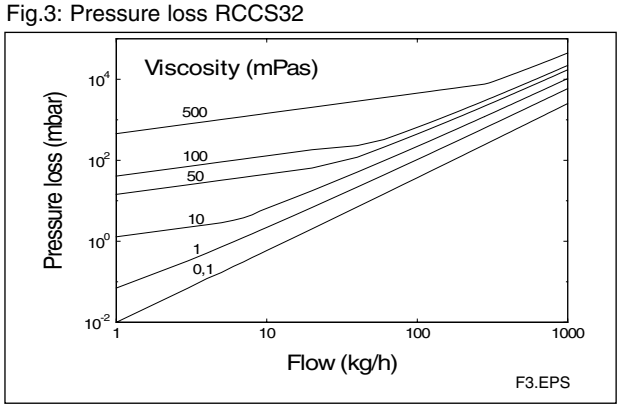


Fig.4: Pressure loss RCCS33

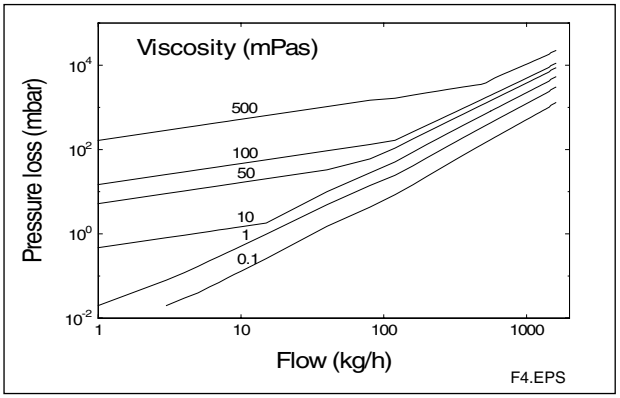


Fig.5: Pressure loss RCCS/RCCT34

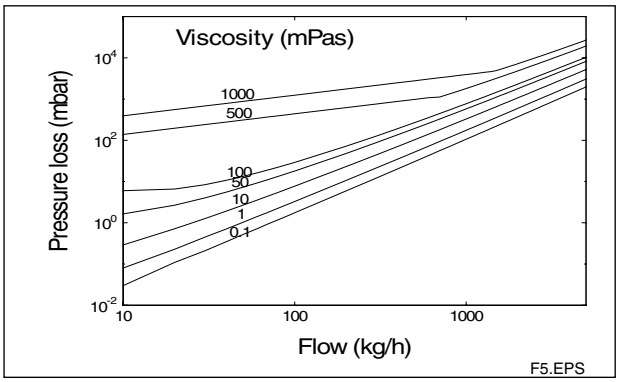


Fig.6: Pressure loss RCCS/RCCT36

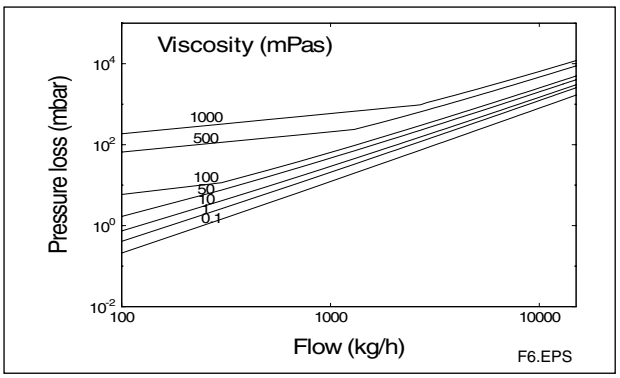


Fig.7: Pressure loss RCCS/RCCT38

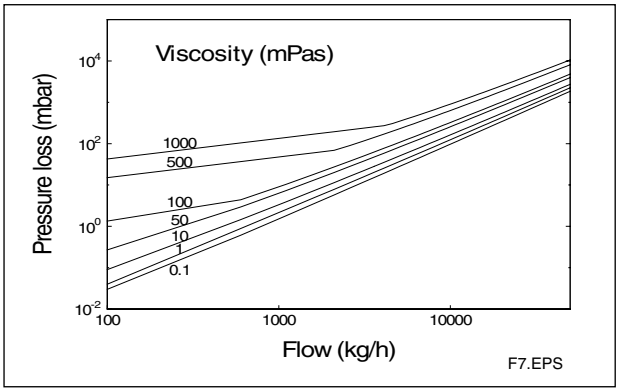


Fig.8: Pressure loss RCCS/RCCT39

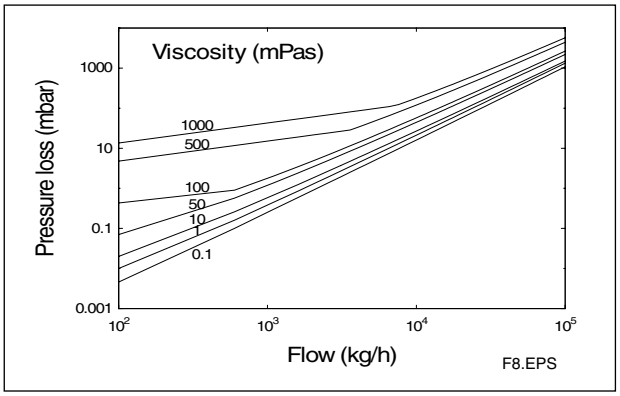


Fig.9: Pressure loss RCCS/RCCT39/IR

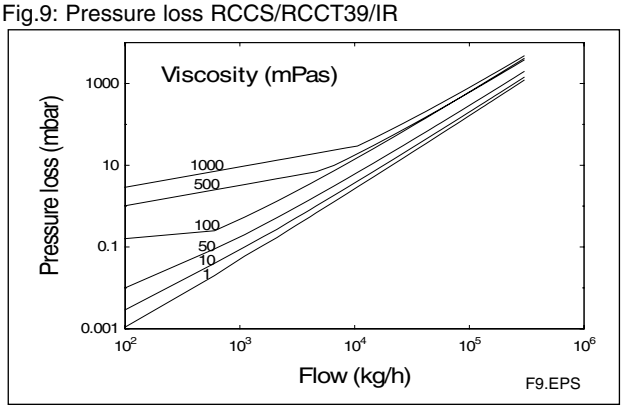
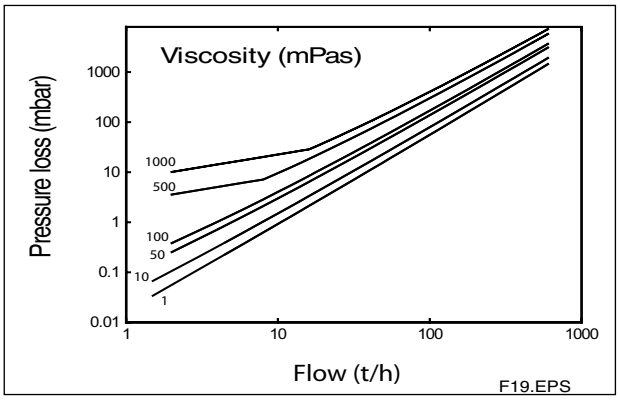


Fig.10: Pressure loss RCCS/RCCT39/XR



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 flow meter 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 flow meters 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 diagrams. Check whether the measuring range and accuracy at minimal flow fit the application. The calculations of the pressure loss are based on Newtonian fluids. Refer to pressure diagrams Fig. 1 to Fig. 10. For correct sizing use the RotaMass Sizing software DUREP V which is part of the Yokogawa Flow Configurator.

Sanitary Applications
For sanitary applications select process connection S2, S4 or S8. The wetted surface will be Ra ≤ 1.6µm. 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 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 sizing program)

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. The converter should not be exceeded more than 50°C. Therefore never insulate the converter and keep the neck free from insulation too. 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. For low temperature fluids ask for special insulation.

Installation above 100°C process temperature
To provide enough cooling the instrument should be installed vertically or horizontal with the converter down. This is recommended for size RCCT/S36 and larger without /Tx option.

Installation below 0°C process temperature
The detector can be insulated either by the customer or by the manufacturer. Ask your Yokogawa representativ 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.

Pressure / Temperature dependencies of process connections
See also process pressure limits in chapter ”Normal operation conditions”.

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 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).
Monitor the status “free of gas” by checking fluid density.

Explosion proof concept and option /HP
The detector is intrinsically safe, the converter flame (explosion) proof (RCCF31) or intrinsically safe associated apparatus (RCCR31). The driving power from converter to detector is limited and protected by a barrier, which is part of the converter. The barrier is protecting the detector either for gas group IIC or IIB (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.
Option /KF2 delivers one passive intrinsic safe current and one pulse output, however the converter is flame (explosion) proof.

Density measurement RCCC30-33
For accurate density measurements an accurate temperature measurement is mandatory. Due to small flow rates the temperature reading may be strongly influenced by environmental temperatures differing from fluid temperature. Therefore in this cases it is recommended to sufficient isolate the detector.

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 7 : Pressure rating

Type Process connection [1]			Medium Temperature							
			RT [2]	50°C	100°C	150°C	200°C	250°C	300°C	350°C
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	69.6 bar	62.8 bar	58.3 bar	54.9 bar	52.1 bar	50.1 bar
A4	Flange acc. ASME B16.5 Class 900		124.1bar	120.1bar	104.4bar	94.2 bar	87.5 bar	82.4 bar	78.2 bar	75.2 bar
A5	Flange acc. ASME B16.5 Class 1500		206.8bar	200.1bar	173.9bar	157.0bar	145.8bar	137.3bar	130.3bar	125.4bar
D2	Flange acc. EN1092-1 PN16		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. EN1092-1 PN40		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. EN1092-1 PN63		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. EN1092-1 PN100		100 bar	97.7 bar	88.9 bar	80.0 bar	73.3 bar	68.0 bar	64.4 bar	61.8 bar
G9	Internal thread G1/4" (RCCS30-33)		see tube pressure				- -			
T9	Internal thread NPT (RCCS30-33)		see tube pressure				- -			
G9	Internal thread G (RCCS34)		see tube pressure							
T9	Internal thread NPT (RCCS34)		see tube pressure							

			Medium Temperature			
			up to 120°C	220°C	300°C	350°C
J1	Flange acc. JIS B 2220 10K		14 bar	12 bar	10 bar	-----
J2	Flange acc. JIS B 2220 20K		34 bar	31 bar	29 bar	26 bar

			Medium Temperature	
			up to 140°C *)	
S2	Pipe conection acc. DIN11851	up to DN40	40 bar	*) under the restriction using suitable gasket materials
		DN50 to DN100	25 bar	
		above DN100	16 bar	

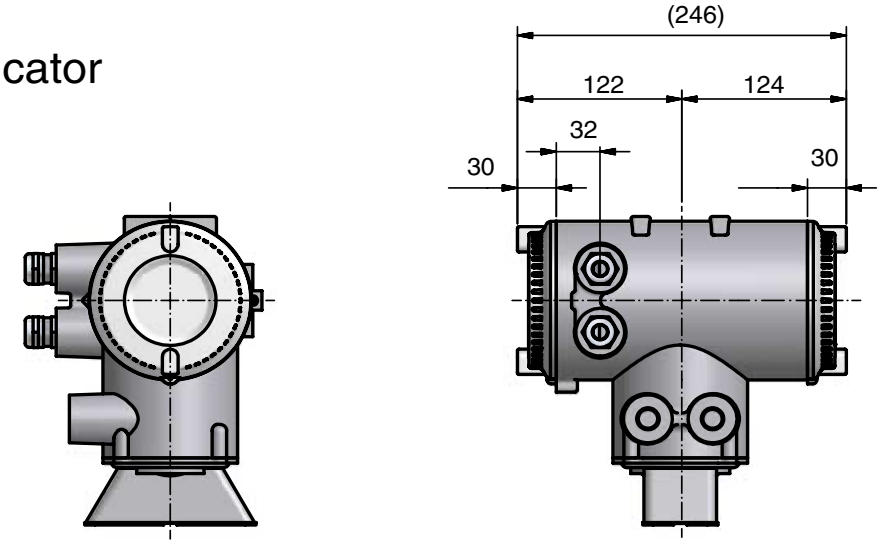
			Medium Temperature	
			up to 150°C **)	
S4	Clamp connection acc. DIN32676	up to DN50	16 bar	**) under the restriction using suitable gasket materials
		above DN50	10 bar	
S8	Clamp acc. Mini-Clamp	up to ½ in (½")	16 bar	
	Clamp acc. Tri-Clamp	up to 2 in (2")		
		above 2 in (2")	10 bar	

1) all process connections acc. AISI 316L (1.4404 / 1.4435) T8.EPS
2) RT = Room Temperature; EN1092 : -10°C to 50°C ; ASME B16.5 : -29°C to 38°C

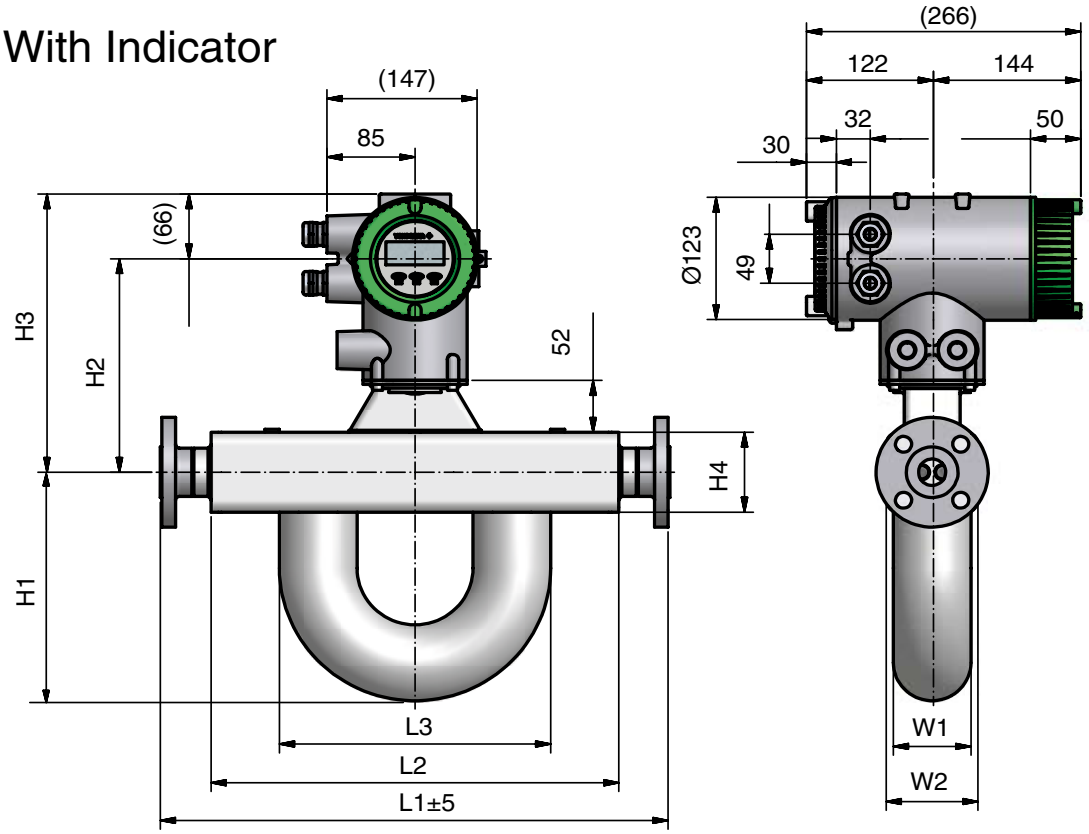
DIMENSIONS

Integral type RCCT34 - 39/IR

Without Indicator



With Indicator



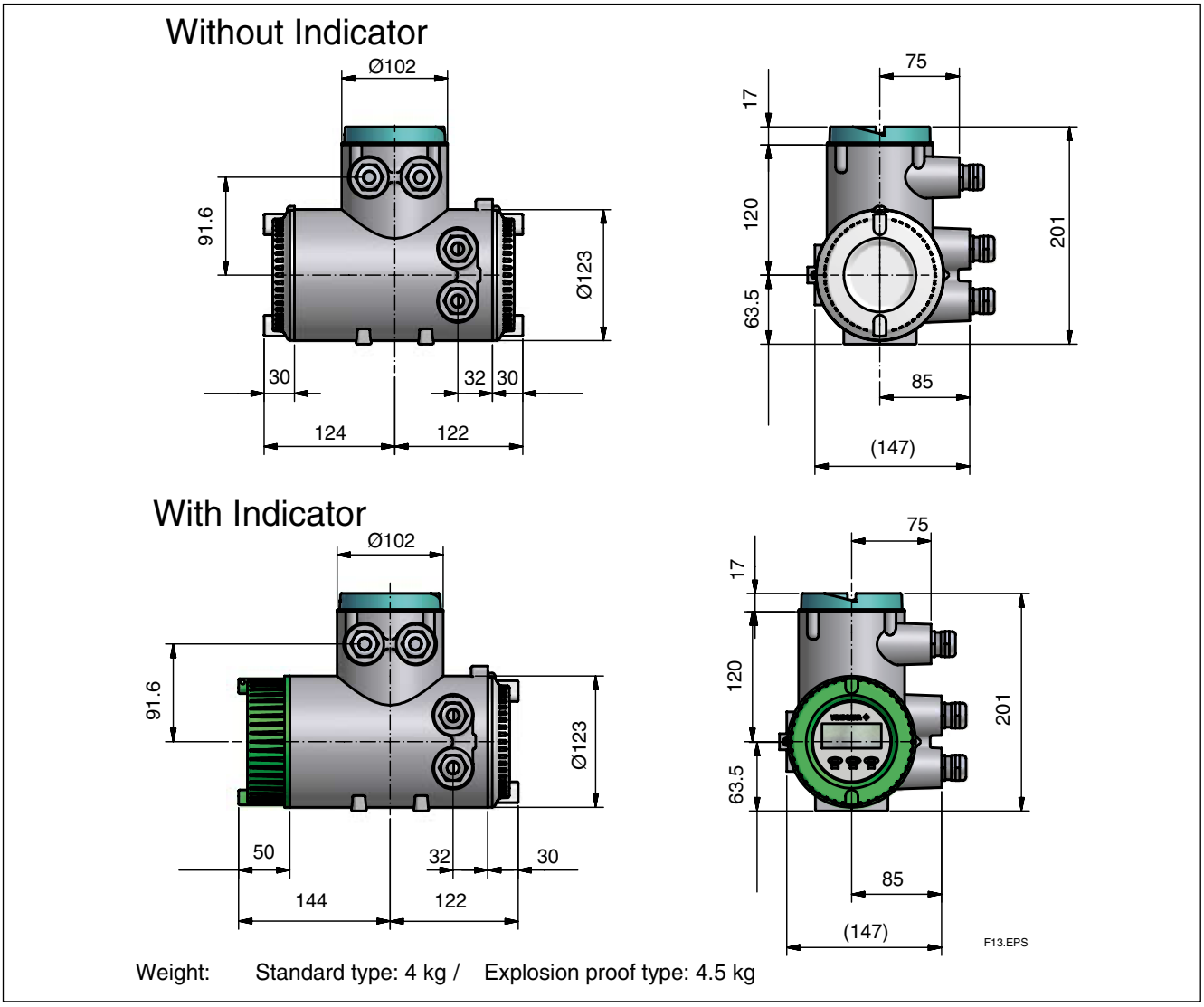
Note : the flange dimensions depend on size and pressure rating of the flange

Model		L1	L2	L3	H1	H2	H3	H4	W1	W2	Weight
RCCT34	[mm]	see table 8	272	212	180	212	278	80	60	80	13 kg
RCCT36	[mm]	see table 8	400	266	233	212	278	80	76	90	17 kg
RCCT38	[mm]	see table 8	490	267	274	222	288	100	89	110	26 kg
RCCT39	[mm]	see table 8	850	379	430	240	306	135	129	160	64 kg
RCCT39/IR	[mm]	see table 8	870	455	453	272	338	200	155	200	92 kg
RCCT39/XR	[mm]	see separate figure on page 16									

Dimensions are given in mm
Weights with smallest flanges

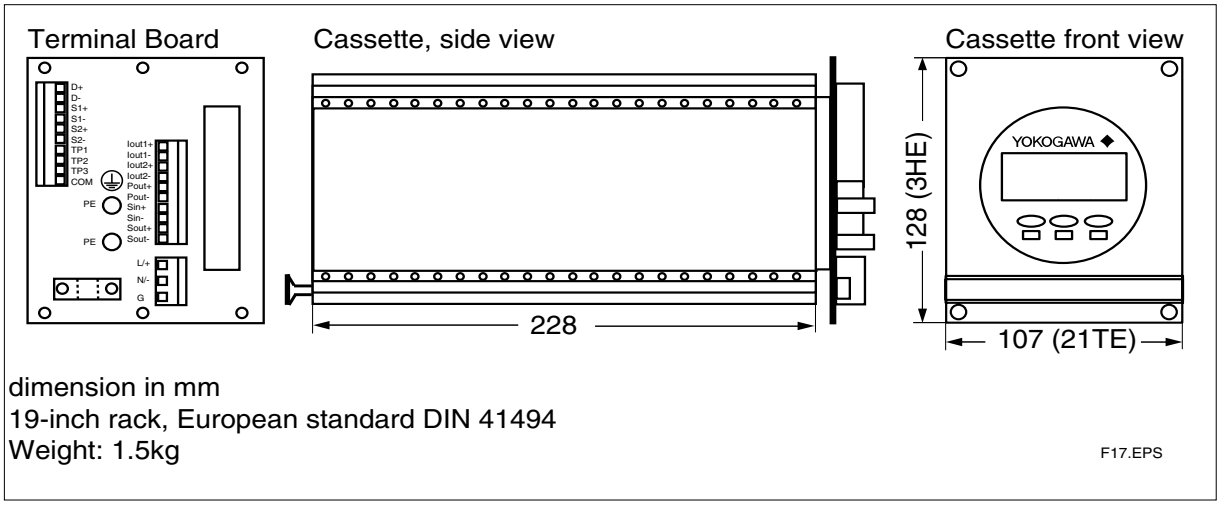
F12.EPS

Remote field-mount converter RCCF31



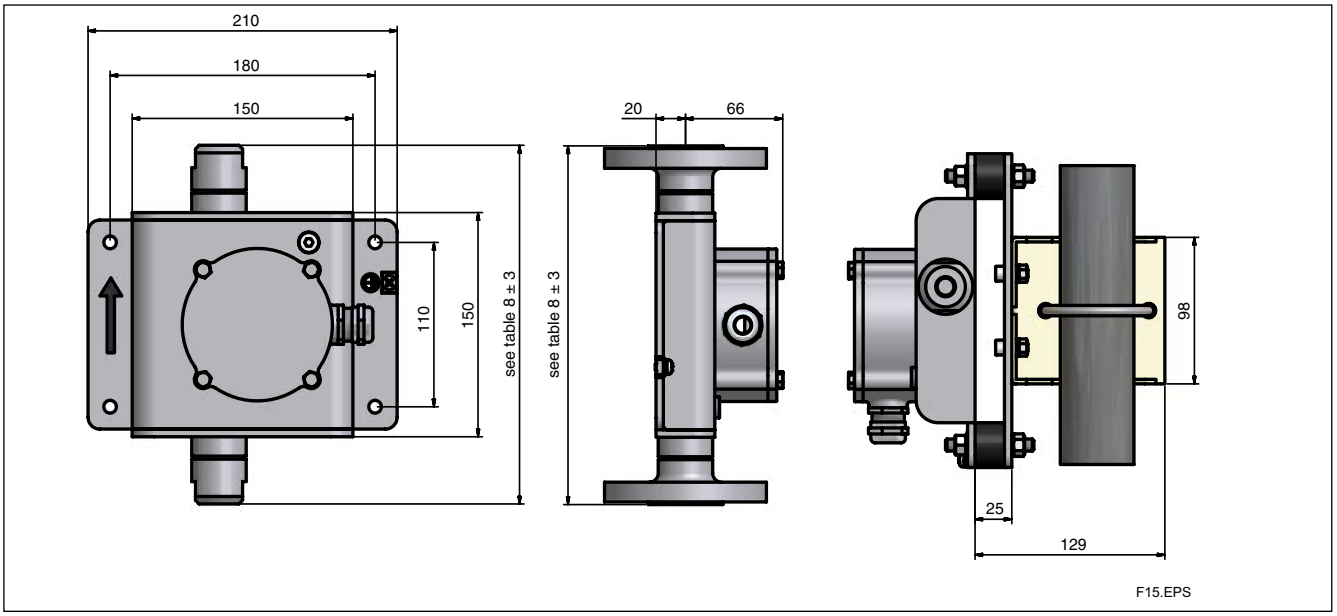
Weight: Standard type: 4 kg / Explosion proof type: 4.5 kg

Remote rack-mount converter RCCR31



dimension in mm
19-inch rack, European standard DIN 41494
Weight: 1.5kg

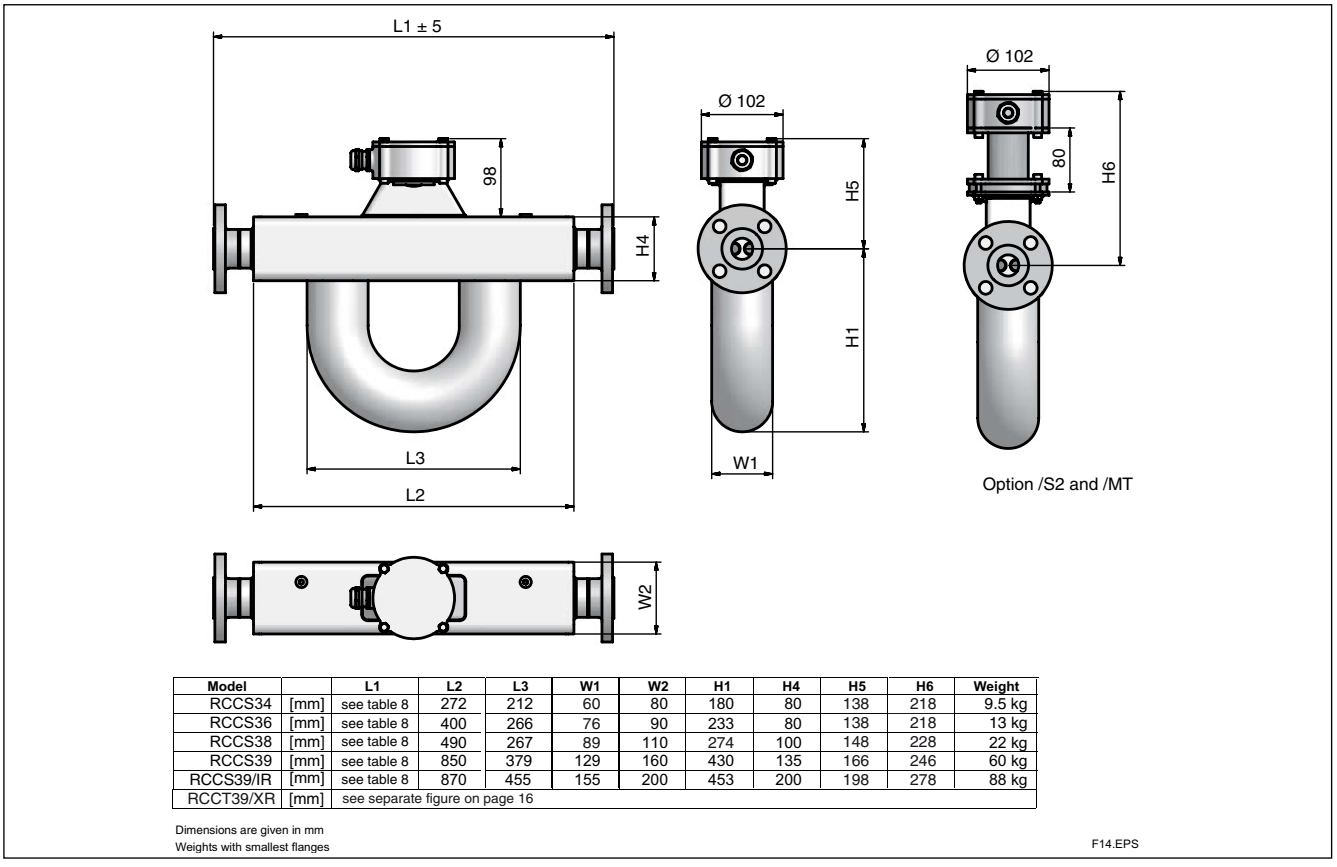
Remote Detector RCCS30 - 33



Dimensions in mm.

Weight (without flanges): 3.5kg

Remote Detector RCCS34 - 39/IR

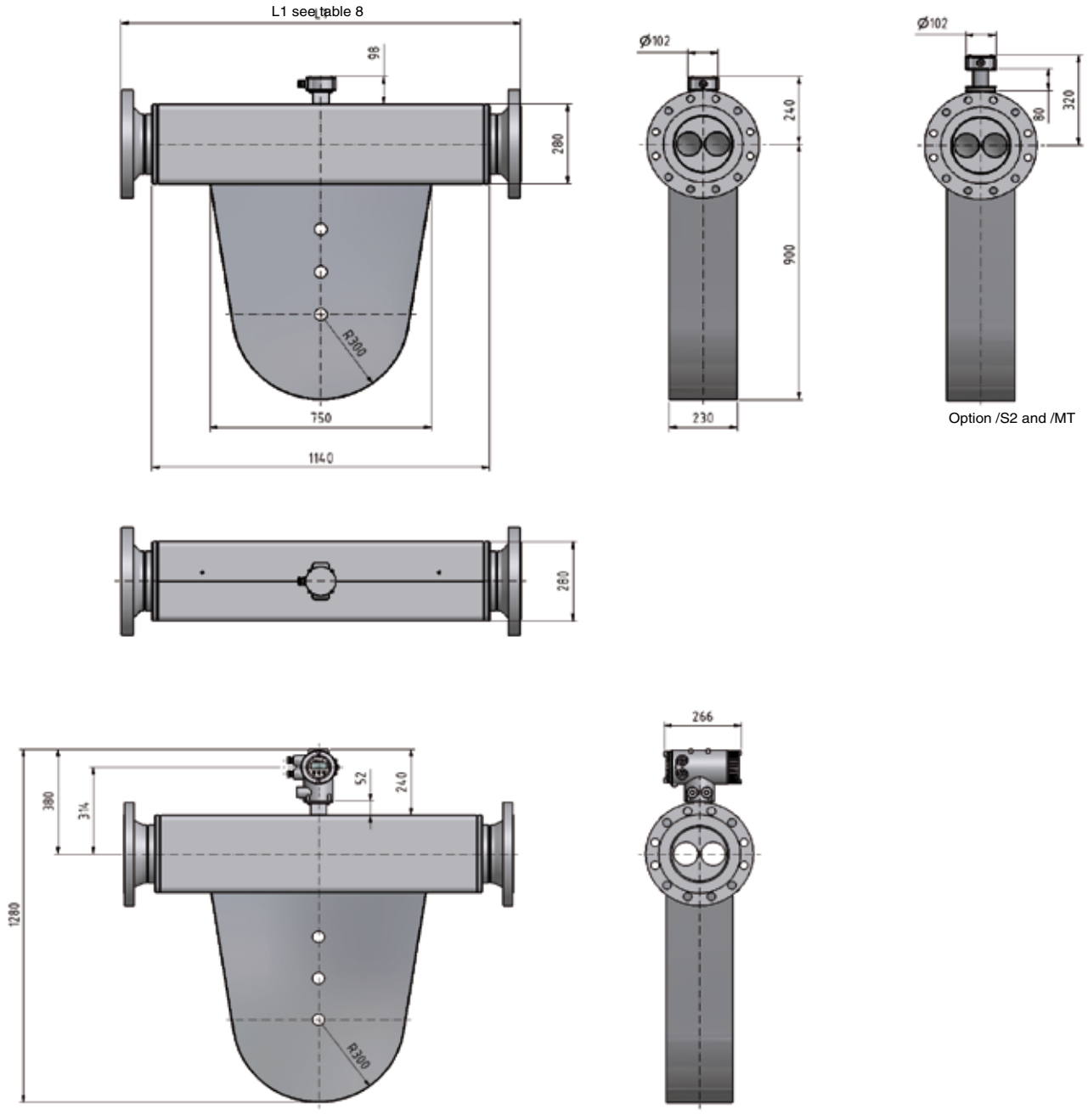


Model		L1	L2	L3	W1	W2	H1	H4	H5	H6	Weight
RCCS34	[mm]	see table 8	272	212	60	80	180	80	138	218	9.5 kg
RCCS36	[mm]	see table 8	400	266	76	90	233	80	138	218	13 kg
RCCS38	[mm]	see table 8	490	267	89	110	274	100	148	228	22 kg
RCCS39	[mm]	see table 8	850	379	129	160	430	135	166	246	60 kg
RCCS39/IR	[mm]	see table 8	870	455	155	200	453	200	198	278	88 kg
RCCT39/XR	[mm]	see separate figure on page 16									

Dimensions are given in mm
Weights with smallest flanges

F14.EPS

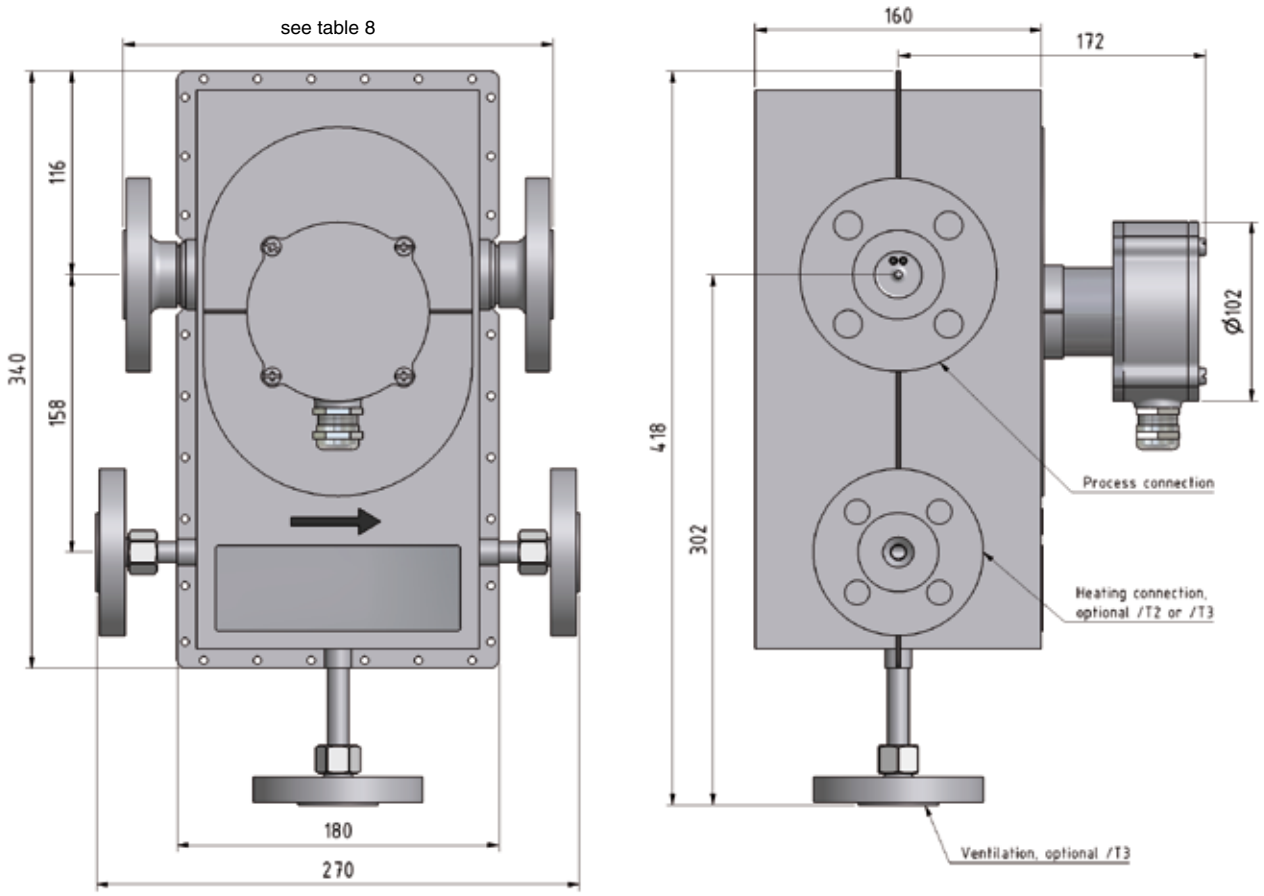
Remote Detector RCCS39/XR / Integral type RCCT39/XR



Dimensions in mm
Weight : RCCS39/XR : 290 ... 320 kg depending on flanges
RCCT39/XR : 295 ... 325 kg depending on flanges

F20.EPS

Remote Detector RCCS30 - 33 with option /Tx (Insulation / Heating)



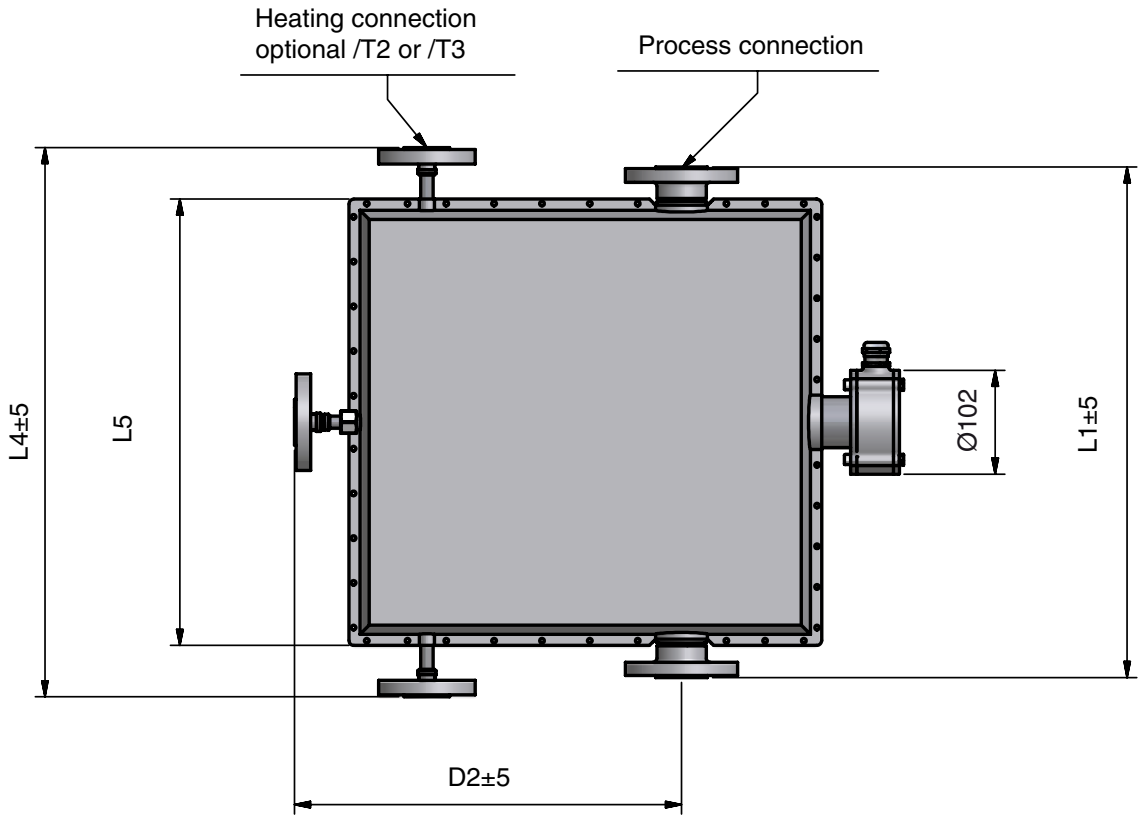
Dimensions in mm
Weight (without process flanges): 12kg

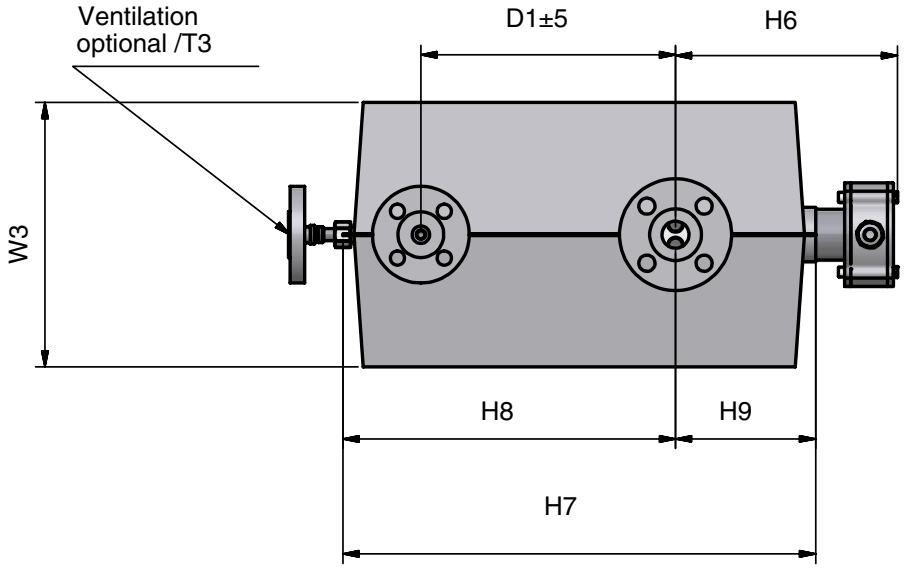
F21.EPS

Heating connections as standard depending on process connection type:

Process connection	Standard heating connection
Ax	ASME 1/2 - 150
Dx	EN DN15 PN40
Jx	JIS 10K DN15
S2 ; S4	EN DN15 PN40
S8	ASME 1/2 - 150
G9	EN DN15 PN40
T9	ASME 1/2 - 150

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





Model		L1	L4	L5	D1	D2	H6	H7	H8	H9	W3	weight
RCCS34	[mm]	see table 8	420	310	200	330	218	411	273	138	240	18 kg
RCCS36	[mm]	see table 8	540	439	250	380	218	464	326	138	260	25 kg
RCCS38	[mm]	see table 8	640	530	250	430	228	524	376	148	260	37 kg
RCCS39	[mm]	see table 8	1000	884	350	580	246	684	520	165	304	95 kg
RCCS39/IR	[mm]	see table 8	1040	932	350	590	278	730	530	200	343	125kg

Heating connection standard : EN DN15 PN40, ASME 1/2 - 150, JIS DN15 10K according process connection, see table on page 17
Weights with smallest flanges including insulation cover and heat tracing

F16.EPS

MODEL-, SUFFIX- AND OPTION-CODES

Integral type RCCT3, Modell- and Suffix- Code :

Model	Suffix Code	Description	Restrictions
RCCT34 RCCT36 RCCT38 RCCT39 RCCT39/IR RCCT39/XR		Nominal value : 2.7 t/h = 45 kg/min Nominal value : 9 t/h = 150 kg/min Nominal value : 32 t/h = 533 kg/min Nominal value : 85 t/h = 1420 kg/min Nominal value : 250 t/h = 4170 kg/min Nominal value : 500 t/h = 8340 kg/min	
Power supply	-A -D	100 - 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 ANSI 1/2“ NPT, female thread	 mandatory with /FF1 or /FF3
Process connection size *)	23 01 02 04 05 06 08 10 12 15 20	¾´´ DN 15 , ½“ DN 25 , 1“ DN 40 , 1 ½“ DN 50 , 2“ DN 65 , 2 ½“ DN 80 , 3“ DN 100, 4“ DN 125, 5“ DN 150, 6” DN 200, 8”	see table 8 see table 8 see table 8 see table 8 see table 8 see table 8 see table 8 see table 8 see table 8 see table 8 see table 8
Process connection rating and style *)	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. EN flange PN 16, process connection dim + facing acc. EN1092 - 1 Form B1 EN flange PN 40, process connection dim + facing acc. EN1092 - 1 Form B1 EN flange PN 63, process connection dim + facing acc. EN1092 - 1 Form B2 EN flange PN 100, process connection dim + facing acc. EN1092 - 1 Form B2 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 8 see table 8 see table 8 see table 8 see table 8 see table 8 see table 8 see table 8 see table 8 see table 8 see table 8 see table 8 see table 8 see table 8 see table 8 see table 8
Material of wetted parts *)	SL HC	Stainless steel 316L (1.4404) Hastelloy C-22 (2.4602)	 only RCCT34 to 39/IR

*) see selection table process connection and materials (table 8)

Integral type RCCT3, Option- Code :

Options	Option Code	Description	Restrictions
Hazardous area approvals	/KF1	ATEX flame proof converter + intrinsic safe detector	not with /FB, with /HP for gas group IIB
	/KF2	ATEX flame proof converter + intrinsic safe detector + intrinsic safe outputs *)	not with /FB, with /HP for gas group IIB
	/KF3	ATEX flame proof converter + intrinsic safe detector	only with /FB, with /HP for gas group IIB
	/KF4	ATEX flame proof converter + intrinsic safe detector + intrinsic safe output *)	only with /FB, with /HP for gas group IIB
	/FF1	FM approval for USA + Canada, flame proof converter + intrinsic safe detector	only with cable conduit connection "A", not with /FB, with /HP not for groups A and B
	/FF3	FM approval for USA + Canada, flame proof converter + intrinsic safe detector	only with cable conduit connection "A", only with /FB, with /HP not for groups A and B
	/EF1	IECEx flame proof converter + intrinsic safe detector	not with /FB,with /HP for gas group IIB
	/EF2	IECEx flame proof conv.+ intrinsic safe detector connection. + intrinsic safe outputs *)	not with /FB, with /HP for gas group IIB
	/EF3	IECEx flame proof converter + intrinsic safe detector	only with /FB, with /HP for gas group IIB
	/EF4	IECEx flame proof conv.+ intrinsic safe detector connection + intrinsic safe fieldbus connection *)	only with /FB, with /HP for gas group IIB
	/UF1	INMETRO flame proof converter + intrinsic safe detector	not with /FB, with /HP for gas group IIB
	/UF2	INMETRO flame proof converter + intrinsic safe detector + intrinsic safe outputs *)	not with /FB, with /HP for gas group IIB
	/UF3	INMETRO flame proof converter + intrinsic safe detector	only with /FB, with /HP for gas group IIB
	/UF4	INMETRO flame proof converter + intrinsic safe detector + intrinsic safe output *)	only with /FB, with /HP for gas group IIB
High driving power	/HP	High driving power	not for RCCT34, recommended for RCCT36 to 39, strongly recommended for RCCT39/IR, mandatory for RCCT39/XR
Fieldbus Communication	/FB	Digital communication (FOUNDATION Fieldbus protocol, refer to GS 01R04B05-00E)	
	/LC1	Provides a PID control function block	only with /FB
	/EE	Provides software download capability	only with /FB
	/BT3	With customer specified tag number for FF- communication + node address in converter	max. 32 digits software tag + node address, only with /FB
Active Pulse Output	/AP	One active pulse output	not with /KF2, not with /FB
NAMUR Switch	/NM	One pulse output according EN60947-5-6 (NAMUR)	not with /FB
Analog alarm levels	/NA	Analog output alarm levels 2.4mA or 21.6mA (Standard is acc. NAMUR rec.43)	not with /FB
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, not with /FB
Flange facing	/DN	Flange with safety grooves acc. EN 1092-1 form D	only for EN flanges, not HC
Gas Measurement	/GA	Gas measurement, special factory adjustment and setting	
Special calibration	/K2 **)	Mass flow using water with factory certificate	
	/K3	Density calib. with different media, range (0.75<ρ<1.6) kg/l	not RCCT39/IR and 39/XR
	/K5 **)	Mass flow using water with DKD certificate (traceable to German national standard)	not with /FB
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 fett free for wetted surfaces acc. ASTM G93-03,level C	
GOST approval	/QR1	Russian GOST approval	see page 8, not for RCCT39/XR
	/QR2	Kazachian GOST approval	see page 8, not for RCCT39/XR
Sanitary	/SF1	Surface roughness, Ra = 0.8µm	only RCCT34 to 39, only for process connections S4 or S8
	/SF2	As /SF1 + Test report roughness of wetted parts	
	/SA	As /SF2 + 3A-Declaration of conformity and 3A-mark at flowmeter	
	/SE	As /SF2 + EHEDG certificate	
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 : 40 bar (RCCT34, RCCT36), 25 bar (RCCT38), 10 bar (RCCT39, RCCT39/IR)	not for RCCT39/XR
X-Ray examination	/RT	X-Ray examination of flange welding	only for wetted parts stainless steel (SL)
PMI examination	/PM6	PAMI test (6 test points: process connection inlet+outlet, measuring tubes, flow divider inlet+outlet) ***)	
Dye penetration test	/PT	Dye penetration test of flange welding	
Epoxy coating	/X1	Epoxy coating of converter housing	
Concentration measurement	/CST	Standard Concentration Measurement	
	/Cxx	Advanced Concentration Measurement, details see table "Advanced Concentration Measurement Options" on page 25	
Instruction Manuals	/IEn	Quantity of instruction manuals in English	n = 1 to 9 selectable ****)
	/IDn	Quantity of instruction manuals in German	n = 1 to 9 selectable ****)
	/IFn	Quantity of instruction manuals in French	n = 1 to 9 selectable ****)
Quick Delivery	/QD	Delivery within 24 hours from factory	not RCCT39/IR, RCCT39/XR, not with process connection size 23, 12, only with process connection rating A1, A2, D4, only material SL, only for options /KF1, /FF1, /EF1, /UF1, /AP, /NM, /NA, /BG, /P2, /P3, /P8, /Cxx, /IEx, /IDx, /IFx
Special order	/Z	Special design must be specified in an extra text.	

*) This is a flame proof device, not an intrinsic safe device !
**) Calibration-Ordersheet must be delivered with the order. This is available on the Flow Center Page at Coriolis / RCCx3 / Technical Information
***) For detailed information please see TI 01R04B04-04E-E
****) If no instruction manual is selected, only a CD with instruction manuals is shipped with the instrument

Remote detector RCCS3, Model- and Suffix- Code :

Model	Suffix Code			Description	Restrictions
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 : 0.9 t/h = 15 kg/min	
RCCS34				Nominal value : 2.7 t/h = 45 kg/min	
RCCS36				Nominal value : 9 t/h = 150 kg/min	
RCCS38				Nominal value : 32 t/h = 533 kg/min	
RCCS39				Nominal value : 85 t/h = 1420 kg/min	
RCCS39/IR				Nominal value : 250 t/h = 4170 kg/min	
RCCS39/XR				Nominal value : 500 t/h = 8340 kg/min	
Cable conduit connection	-M			M20x1, female thread	
	-A			ANSI 1/2 NPT, female thread	mandatory with /FS1
Process connection size *)		41		¼´´	see table 8
		01		DN 15 , ½“	see table 8
		23		¾´´	see table 8
		02		DN 25 , 1“	see table 8
		04		DN 40 , 1 ½“	see table 8
		05		DN 50 , 2“	see table 8
		06		DN 65 , 2 ½“	see table 8
		08		DN 80 , 3“	see table 8
		10		DN 100, 4“	see table 8
		12		DN 125, 5“	see table 8
		15		DN 150, 6”	see table 8
		20		DN 200, 8”	see table 8
Process connection rating and style *)			A1	ASME flange class 150, process connection dim. + facing acc. ASME B16.5	see table 8
			A2	ASME flange class 300, process connection dim. + facing acc. ASME B16.5	see table 8
			A3	ASME flange class 600, process connection dim. + facing acc. ASME B16.5	see table 8
			A4	ASME flange class 900, process connection dim. + facing acc. ASME B16.5	see table 8
			A5	ASME flange class 1500, process connection dim. + facing acc. ASME B16.5	see table 8
			D2	EN flange PN 16, process connection dim + facing acc. EN1092 - 1 Form B1	see table 8
			D4	EN flange PN 40, process connection dim + facing acc. EN1092 - 1 Form B1	see table 8
			D5	EN flange PN 63, process connection dim + facing acc. EN1092 - 1 Form B2	see table 8
			D6	EN flange PN 100, process connection dim + facing acc. EN1092 - 1 Form B2	see table 8
			J1	JIS flange 10K , JIS B 2220	see table 8
			J2	JIS flange 20K , JIS B 2220	see table 8
			S2	Thread acc. DIN 11851	see table 8
			S4	Clamp, DIN inside diameter	see table 8
			S8	Clamp, process connection dimensions acc. Tri-Clover (Tri-Clamp) and ½´´ Mini Clamp	see table 8
			G9	G female thread	see table 8
			T9	NPT female thread	see table 8
Material of wetted parts *)			SH	316L (1.4404) and Hastelloy C-22 (2.4602) for tube	only RCCS30 ... 33
			SL	Stainless steel 316L (1.4404)	only RCCS34 … 39/XR
			HC	Hastelloy C-22 (2.4602)	only RCCS34 … 39/IR

*) see selection table process connection and materials (table 8)

Remote detector RCCS3, Option- Code :

Options	Option Code	Description	Restrictions
Hazardous area installation	/KS1 /FS1 /ES1 /US1	ATEX intrinsically safe approval FM approval for USA and Canada IECEx intrinsically safe approval INMETRO intrinsically safe approval for Brazil	only cable conduit connection "A"
Tag number	/BG	With customer specified tag number on name plate	max. 16 digits
Flange facing	/DN	Flange with safety grooves acc. EN 1092-1 form D	only for EN flanges, not HC
Gas measurement	/GA	Gas measurement, special factory adjustment and setting	select affiliated RCCF31 with /GA
Extended temperature range	/MT	150°C< Tmedium < 230°C	only RCCS34 to 39/XR, always with /S2, remote cable RCCY033 / 034 recommended
High temperature version	/HT	Tmedium up to 350°C	only in combination with /Tx, only RCCS34 to 39/IR, remote cable RCCY033 / 034 recommended
Special calibration	/K2 *) /K3 /K5 *)	Mass flow using water with factory certificate Density calibration with different media of the range (0.75<ρ<1.6) kg/l Mass flow using water with DKD certificate (traceable to German national standard)	not for RCCS39/IR + RCCS39/XR; only available if converter is also ordered not with /FB; not for RCCS30
Certificates	/P2 /P3 /P6 /P8 /H1	Certificate of Compliance with the order acc. to EN 10204: 2004- 2.1 As /P2 +Test report acc. to EN 10204: 2004- 2.2 Material certificate acc. to EN 10204: 2004- 3.1 Pressure test report measuring system Oil and fat free for wetted surfaces acc.ASTM G93-03,level C	
GOST approval	/QR1 /QR2	Russian GOST approval Kazachian GOST approval	see page 8, not for RCCS39/XR see page 8, not for RCCS39/XR
Sanitary	/SF1 /SF2 /SA /SE	Surface roughness, Ra = 0.8µm As /SF1 + Test report roughness of wetted parts As /SF2 + 3A-Declaration of conformity and 3A-mark at flowmeter As /SF2 + EHEDG certificate	only RCCS34 to 39 only for process connections S4 or S8
Mounting set	/PD	2 inch pipe mounting brackets	only for RCCS30 to 33, not with /Tx recommended for RCCS30
Housing pressure test	/J1	Rupture pressure proof test and certificate : 40 bar (RCCS34, RCCS36), 25 bar (RCCS38), 10bar (RCCS39,RCCS39/IR)	not for RCCS30 to 33 and RCCS39/XR
Customer insulation / heating	/S2	Terminal box on extension for high- and low- process temperature	not with /Tx
Insulation / heating	/T1 /T2 /T3	Insulation Insulation + Heat carrier heating Insulation + Heat carrier heating with ventilation	/T1, /T2, /T3 not for RCCS39/XR, for RCCS30 to 33 not for hazardous area installation /KS1, /FS1, /ES1, /US1
X-Ray examination	/RT	X-Ray examination of flange welding	only for wetted parts stainless steel (SL/SH)
PMI examination	/PM4 /PM6	PAMI test (4 test points: process connection inlet, flow divider inlet, flow divider outlet, process connection outlet)**) PAMI test (6 test points: process connection inlet+outlet, measuring tubes, flow divider inlet+outlet) ***)	only for RCCS30 to 33 only for RCCS34 to 39/XR
Dye penetration test	/PT	Dye penetration test of flange welding	
Stainless steel cable gland	/BS	Cable gland stainless steel	
Quick Delivery	/QD	Delivery within 24 hours from factory	not RCCS39/IR, not RCCS39/XR, not with process connection size 23, 12, only with process connection rating A1,A2,D4, only material SL, only for options /KS1, /FS1, /ES1, /US1, /BG, /P2, /P3, /P8
Special order	/Z	Special design must be specified in an extra text.	

*) Calibration-Ordersheet must be delivered with the order. This is available on the Flow Center Page at Coriolis / RCCx3 / Technical Information

**) Measuring tube PAMI testing is performed per delivery batch

***) For detailed information please see TI 01R04B04-04E-E

Remote field-mount converter RCCF31, Model-, Suffix- and Option- Code :

Model	Suffix Code	Option Code	Description	Restrictions
RCCF31			Remote field-mount converter to be combined with RCCS3	
Power Supply	-A		100–264 V AC	
	-D		24 V DC	
Indicator direction	H2		With indicator	
	N0		Without indicator	
Cable conduit connections	M		M20 x 1.5	
	A		ANSI 1/2“ NPT, only cable gland for detector connection	mandatory with /FF1 and /FF3
Options :				
Hazardous area approvals		/KF1	ATEX flame proof converter + intrinsic safe detector connection	not with /FB, with /HP for gas group IIB
		/KF2	ATEX flame proof conv.+ intrinsic safe detector connect. + intrinsic safe outputs *)	not with /FB, with /HP for gas group IIB
		/KF3	ATEX flame proof converter + intrinsic safe detector connection	only with /FB, with /HP for gas group IIB
		/KF4	ATEX flame proof conv.+ intrinsic safe detector connection + intrinsic safe fieldbus connection *)	only with /FB, with /HP for gas group IIB
		/FF1	FM approval for USA + Canada, flame proof converter + intrinsic safe detector connection	only with cable conduit connection "A", not with /FB, with /HP not for groups A and B
		/FF3	FM approval for USA + Canada, flame proof converter + intrinsic safe detector connection	only with cable conduit connection "A", only with /FB, with /HP not for groups A and B
		/EF1	IECEx flame proof converter + intrinsic safe detector connection	not with /FB,with /HP for gas group IIB
		/EF2	IECEx flame proof conv.+ intrinsic safe detector connection + intrinsic safe outputs *)	not with /FB, with /HP for gas group IIB
		/EF3	IECEx flame proof converter + intrinsic safe detector connection	only with /FB, with /HP for gas group IIB
		/EF4	IECEx flame proof conv.+ intrinsic safe detector connection + intrinsic safe fieldbus connection *)	only with /FB, with /HP for gas group IIB
		/UF1	INMETRO flame proof converter + intrinsic safe detector connect.	not with /FB, with /HP for gas group IIB
		/UF2	INMETRO flame proof converter + intrinsic safe detector connect. + intrinsic safe outputs *)	not with /FB, with /HP for gas group IIB
		/UF3	INMETRO flame proof converter + intrinsic safe detector connect.	only with /FB, with /HP for gas group IIB
		/UF4	INMETRO flame proof converter + intrinsic safe detector connect. + intrinsic safe output *)	only with /FB, with /HP for gas group IIB
High driving power		/HP	High driving power	Not for combination with RCCS30 to 34 recommended for combination with RCCS36 to 39. Strongly recommended for combination with RCCS39/IR. Mandatory for combination with RCCS39/XR
Fieldbus Communication		/FB	Digital communication (FOUNDATION Fieldbus protocol, refer to GS 01R04B05-00E)	
		/LC1	Provides a PID control function block	only with /FB
		/EE	Provides software download capability	only with /FB
		/BT3	With customer specified tag number for FF- communication + node address in converter	max. 32 digits software tag + node address, only with /FB
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 not with /FB
Active Pulse Output		/AP	One active pulse output	not with /KF2
NAMUR Switch		/NM	One pulse output according EN60947-5-6 (NAMUR)	
Analog alarm levels		/NA	Analog output alarm levels 2.4mA or 21.6mA (Standard is acc. NAMUR rec.43)	
Gas measurement		/GA	Gas measurement, special factory adjustment and setting	select affiliated RCCS3x with /GA
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	
Concentration measurement		/CST	Standard Concentration Measurement	
		/Cxx	Advanced Concentration Measurement, details see table "Advanced Concentration Measurement Options" on page 25	
GOST approval		/QR1	Russian GOST approval	see page 8
		/QR2	Kazachian GOST approval	see page 8
Instruction Manuals		IEn	Quantity of instruction manuals in English	n = 1 to 9 selectable **)
		IDn	Quantity of instruction manuals in German	n = 1 to 9 selectable **)
		IFn	Quantity of instruction manuals in French	n = 1 to 9 selectable **)
Quick Delivery		/QD	Delivery within 24 hours from factory	not with /KF2, EF2, /UF2, /FB, /GA, /PS, /X1
Special order		/Z	Special design must be specified in an extra text	

*) This is a flame proof device, not an intrinsic safe device !

**) If no instruction manual is selected, only a CD with instruction manuals is shipped with the instrument

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 combined with RCCS3	
Power Supply	-A		100–264 V AC	
	-D		24 V DC	
Options :				
Hazardous area approval		/KS1	ATEX associated apparatus for intrinsic safe detector connection for gas group IIC	with /HP for gas group IIB
		/FS1	FM associated apparatus for intrinsic safe detector connection	with /HP not for groups A and B
		/ES1	IECEx associated apparatus for intrinsic safe detector connection for gas group IIC	with /HP for gas group IIB
		/US1	INMERTRO associated apparatus for intrinsic safe detector connection for gas group IIC	with /HP for gas group IIB
High driving power		/HP	High driving power	Not for combination with RCCS30 to 34 recommended for combination with RCCS36 to 39. Strongly recommended for combination with RCCS39/IR. Mandatory for combination with RCCS39/XR
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
Active Pulse Output		/AP	One active pulse output	
NAMUR Switch		/NM	One pulse output according EN60947-5-6 (NAMUR)	
Analog alarm levels		/NA	Analog output alarm levels 2.4mA or 21.6mA (Standard is acc. NAMUR rec.43)	
Gas measurement		/GA	Gas measurement, special factory adjustment and setting	select affiliated RCCS3x with /GA
No combination		/NC	No combination with detector	
Customer Presetting		/PS	Presetting sheet with customer data	has to be issued with the order
Concentration measurement		/CST	Standard Concentration Measurement	
		/Cxx	Advanced Concentration Measurement, details see table "Advanced Concentration Measurement Options" on page 25	
Subrack		/SR2	Subrack for 2 converter RCCR31 with mounting	
		/SR4	Subrack for 4 converter RCCR31 with mounting	
Instruction Manuals		IEn	Quantity of instruction manuals in English	n = 1 to 9 selectable *)
		IDn	Quantity of instruction manuals in German	n = 1 to 9 selectable *)
		IFn	Quantity of instruction manuals in French	n = 1 to 9 selectable *)
Special order		/Z	Special design must be specified in an extra text	

*) If no instruction manual is selected, only a CD with instruction manuals is shipped with the instrument

Remote cable RCCY03, Model-, Suffix- and Option- Code :

Model	Suffix Code	Option Code	Description	Restrictions
RCCY031			Length in “meter”	max. ambient temperature 70°C ; with /FFx or /FS1 : 50°C
RCCY032			Length in “feet”	max. ambient temperature 70°C ; with /FFx or /FS1 : 50°C
RCCY033			Length in “meter”	max. ambient temperature 105°C ; with /FFx or /FS1 : 85°C
RCCY034			Length in “feet”	max. ambient temperature 105°C ; with /FFx or /FS1 : 85°C
Cable ends	-0		No termination, with termination kit	
	-1		Terminated	only RCCY031, RCCY034
Cable length	Lxxx		Enter the length	max. 300m / 999ft (with /FFx or /FS1max. 50m / 165ft); the following lengths can be ordered (e.g. 3m = L003): RCCY031-1: 3m, 5m, 10m, 15m, 30m, 50m RCCY031-0: 3m, 5m, 10m, 15m, 30m, 50m,100m, 150m, 200m, 250m, 300m RCCY032-1: 10ft, 15ft, 30ft, 50ft, 100ft, 150ft RCCY032-0: 10ft, 15ft, 30ft, 50ft, 100ft, 150ft, 300ft, 500ft, 1000ft RCCY033-0: 3m, 5m, 10m, 15m, 50m,100m, 150m, 300m RCCY034-0: 10ft, 20ft, 30ft, 50ft, 100ft, 150ft, 300ft, 500ft, 1000ft
Options :				
Hazardous area installation		/KS1	Blue cable for Ex- i indication	
Termination Kit		/TKxx	Quantity of additional termination kits	xx = 01 to 99
Quick Delivery		/QD	Delivery within 24 hours from factory	only RCCY031-1, L003, L005, L010

Advanced Concentration Measurement Options (others on request) :

Option	Display	Components	Concentration range	Temp. range	Source of the concentration / density table
/C01	°Brix	Sugar / water	0-85 °Brix	0-80°C	PTB-Messages 100 5/90 : „The density of watery Saccharose 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	Source undefined
/C05	WT%	NH_4NO_3 / water	20-70 WT%	20-100°C	Source undefined
/C06	WT%	HCl / water	22-34 WT%	20-60°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	Source undefined
/C09	WT%	H_2O_2 / water	30-75 WT%	4-44°C	Source undefined
/C10	WT%	Ethylen Glycole / water	10-50 WT%	-20-40°C	Source undefined
/C11	WT%	Amylum = starch /water	33-43 WT%	35-45°C	Source undefined
/C12	WT%	Methanol / water	35-60 WT%	0-40°C	Source undefined
/C20	Vol%	Alcohol / water	55-100 Vol%	10-40°C	Source undefined
/C21	°Brix	Sugar / water	40-80 °Brix	75-100°C	Source undefined

T9.EPS

Table 8 : Selection table process connection and materials, installation length

			RCCS 30-32	RCCS 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
Flanges according to ASME B16.5	01A1	½"-150	240	240	370	----	----	----	----	----	----	----	----	----	----
	01A2	½"-300	240	240	370	----	----	----	----	----	----	----	----	----	----
	01A3	½"-600	250	250	380	----	----	----	----	----	----	----	----	----	----
	01A4	½"-900	----	270	----	----	----	----	----	----	----	----	----	----	----
	01A5	½"-1500	270	----	400	----	----	----	----	----	----	----	----	----	----
	02A1	1"-150	240	240	370	390	500	----	----	----	----	----	----	----	----
	02A2	1"-300	240	240	370	390	500	----	----	----	----	----	----	----	----
	02A3	1"-600	260	260	390	----	520	----	----	----	----	----	----	----	----
	02A4	1"-900	----	320	----	----	----	----	----	----	----	----	----	----	----
	02A5	1"-1500	320	----	450	----	540	----	----	----	----	----	----	----	----
	04A1	1½"-150	250	250	380	390	500	520	600	----	----	----	----	----	----
	04A2	1½"-300	250	250	380	390	510	520	600	----	----	----	----	----	----
	04A3	1½"-600	270	270	400	----	530	----	620	----	----	----	----	----	----
	04A4	1½"-900	----	340	----	----	----	----	640	----	----	----	----	----	----
	04A5	1½"-1500	340	----	470	----	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"-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 EN1092-1	01D4	DN15 PN40	240	240	370	----	----	----	----	----	----	----	----	----	----
	01D6	DN15 PN100	250	250	380	----	----	----	----	----	----	----	----	----	----
	02D4	DN25 PN40	240	240	370	390	500	520	----	----	----	----	----	----	----
	02D6	DN25 PN100	260	260	390	----	520	----	----	----	----	----	----	----	----
	04D4	DN40 PN40	240	240	370	390	500	520	600	----	----	----	----	----	----
	04D6	DN40 PN100	320	320	450	----	560	----	620	----	----	----	----	----	----
	05D4	DN50 PN40	----	----	----	----	500	520	600	620	----	----	----	----	----
	05D5	DN50 PN63	----	----	----	----	520	----	620	----	----	----	----	----	----
	05D6	DN50 PN100	----	----	----	----	590	----	660	----	----	----	----	----	----
	08D4	DN80 PN40	----	----	----	----	----	----	610	620	1000	1020	----	----	----
	08D5	DN80 PN63	----	----	----	----	----	----	620	----	1000	----	----	----	----
	08D6	DN80 PN100	----	----	----	----	----	----	730	----	1000	----	----	----	----
	10D2	DN100 PN16	----	----	----	----	----	----	----	----	----	----	1100	----	----
	10D4	DN100 PN40	----	----	----	----	----	----	----	----	1000	1020	1100	----	----
	10D5	DN100 PN63	----	----	----	----	----	----	----	----	1000	----	1100	----	----
	10D6	DN100 PN100	----	----	----	----	----	----	----	----	1050	----	1100	----	----
	12D2	DN125 PN16	----	----	----	----	----	----	----	----	----	----	1100	1100	----
	12D4	DN125 PN40	----	----	----	----	----	----	----	----	1000	1020	1100	1100	----
	12D5	DN125 PN63	----	----	----	----	----	----	----	----	1000	----	1100	----	----
	12D6	DN125 PN100	----	----	----	----	----	----	----	----	1100	----	1140	----	----
	15D2	DN150 PN16	----	----	----	----	----	----	----	----	----	----	1100	1100	1350
	15D4	DN150 PN40	----	----	----	----	----	----	----	----	----	----	1100	1100	1350
	15D5	DN150 PN63	----	----	----	----	----	----	----	----	----	----	1140	----	----
	15D6	DN150 PN100	----	----	----	----	----	----	----	----	----	----	1180	----	----
	20D2	DN200 PN16	----	----	----	----	----	----	----	----	----	----	----	----	1350
	20D4	DN200 PN40	----	----	----	----	----	----	----	----	----	----	----	----	1350

dimensions in [mm]

Table 8 : Selection table process connection and materials, installation length (continued)

			RCCS 30-32	RCCS 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
Flanges according to JIS B 2220	01J1	DN15 10K	240	240	370	----	----	----	----	----	----	----	----	----	----
	01J2	DN15 20K	240	240	370	----	----	----	----	----	----	----	----	----	----
	02J1	DN25 10K	240	240	370	----	500	----	----	----	----	----	----	----	----
	02J2	DN25 20K	240	240	370	----	500	----	----	----	----	----	----	----	----
	04J1	DN40 10K	240	240	370	----	500	----	600	----	----	----	----	----	----
	04J2	DN40 20K	240	240	370	----	500	----	600	----	----	----	----	----	----
	05J1	DN50 10K	----	----	----	----	500	----	600	----	----	----	----	----	----
	05J2	DN50 20K	----	----	----	----	500	----	600	----	----	----	----	----	----
	08J1	DN80 10K	----	----	----	----	----	----	600	----	1000	----	----	----	----
	08J2	DN80 20K	----	----	----	----	----	----	600	----	1000	----	----	----	----
	10J1	DN100 10K	----	----	----	----	----	----	----	----	1000	----	1100	----	----
	10J2	DN100 20K	----	----	----	----	----	----	----	----	1000	----	1100	----	----
	12J1	DN125 10K	----	----	----	----	----	----	----	----	1000	----	1100	----	----
	12J2	DN125 20K	----	----	----	----	----	----	----	----	1000	----	1100	----	----
	15J1	DN150 10K	----	----	----	----	----	----	----	----	----	----	1100	----	----
	15J2	DN150 20K	----	----	----	----	----	----	----	----	----	----	1100	----	----
Clamp DIN	01S4	DN15	240	240	----	----	----	----	----	----	----	----	----	----	----
	02S4	DN25	240	240	370 *)	----	----	----	----	----	----	----	----	----	----
	04S4	DN40	240	240	370	----	500 *)	----	----	----	----	----	----	----	----
	05S4	DN50	----	----	----	----	500	----	600 *)	----	----	----	----	----	----
	06S4	DN65	----	----	----	----	----	----	600	----	----	----	----	----	----
	10S4	DN100	----	----	----	----	----	----	----	----	1000	----	----	----	----
Tri-Clamp	01S8	½"	240	240	----	----	----	----	----	----	----	----	----	----	----
	02S8	1"	240	240	370 *)	----	----	----	----	----	----	----	----	----	----
	04S8	1½"	240	240	370	----	500 *)	----	----	----	----	----	----	----	----
	05S8	2"	----	----	----	----	500	----	600 *)	----	----	----	----	----	----
	08S8	3"	----	----	----	----	----	----	600	----	----	----	----	----	----
	10S8	4"	----	----	----	----	----	----	----	----	1000	----	----	----	----
DIN11851	02S2	DN25	240	240	370	----	----	----	----	----	----	----	----	----	----
	04S2	DN40	----	----	----	----	500	----	----	----	----	----	----	----	----
	05S2	DN50	----	----	----	----	----	----	600	----	----	----	----	----	----
	10S2	DN100	----	----	----	----	----	----	----	----	1000	----	----	----	----
	41G9	G¼" female	240	240	----	----	----	----	----	----	----	----	----	----	----
	01G9	G½" female	240	240	370	----	----	----	----	----	----	----	----	----	----
	23G9	G¾" female	240	240	370	----	----	----	----	----	----	----	----	----	----
	41T9	NPT¼" female	240	240	----	----	----	----	----	----	----	----	----	----	----
	01T9	NPT½" female	240	240	370	----	----	----	----	----	----	----	----	----	----
	23T9	NPT¾" female	240	240	370	----	----	----	----	----	----	----	----	----	----

dimensions in [mm] *) not possible with option /SFx, /SA, /SE

YOKOGAWA HEADQUARTERS
9-32, Nakacho 2-chome,
Musashinoshi
Tokyo 180
Japan
Tel. (81)-422-52-5535
Fax (81)-422-55-1202
E-mail: webinfo@mls.yokogawa.co.jp
www.yokogawa.com

YOKOGAWA CORPORATION OF AMERICA
2 Dart Road
Newnan GA 30265
United States
Tel. (1)-770-253-7000
Fax (1)-770-251-2088
E-mail: info@yca.com
www.yca.com

YOKOGAWA EUROPE B.V.
Databankweg 20
3821 AL AMERSFOORT
The Netherlands
Tel. +31-33-4641 611
Fax +31-33-4641 610
E-mail: info@nl.yokogawa.com
www.yokogawa.com/eu

YOKOGAWA ELECTRIC ASIA Pte. Ltd.
5 Bedok South Road
Singapore 469270
Singapore
Tel. (65)-241-9933
Fax (65)-241-2606
E-mail: webinfo@yas.com.sg
www.yokogawa.com.sg

Yokogawa has an extensive sales and distribution network.
Please refer to the European web-site (www.yokogawa-europe.com) to contact your nearest representative.

YOKOGAWA

GS 01R04B04-00E-E 8th edition Dec. 06, 2007 -00