RISHABH

Data Sheet

RISH CON M+

Programmable Multi-function Transducer

RoHS CE

Measure | Control | Record | Analyze | Optimize

Data Sheet

RISH CON M+

Application:

RISH COM-M+ transducer is used to measure and convert parameters of a single-phase or three-phase AC system with unbalanced or balanced load into a proportional load independent DC current or DC voltage output signal. It also provide digital output which can be configured for energy pulse output or limit output or timer output.

Salient Features:

- 4-in-1 programmable transducer
- Upto 4 Isolated Analog outputs
- True RMS and THD measurement upto 31st Harmonics
- Fast Response time < 300 msec
- Accuracy class 0.2 as per EN/IEC 60688
- Energy Measurement Class 0.5s as per 62053-22
- Fast and easy installation on DIN RAIL and Wall Mount
- Connection Terminal: Conventional Screw type

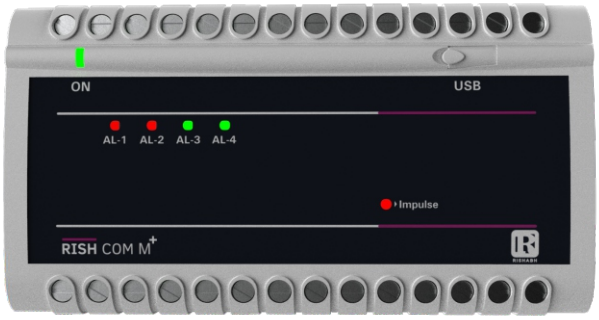
Product Features:

4-in-1 programmable transducers
Measurement parameters like voltage, current, power, frequency and many more can be configured to any analog or digital output.
Voltage or current, Linear or Bent characteristic configurable for all analog output.
Digital output configurable to Pulse output, Limit output or timer output.

Fast Response Time
Analog Output response time is less than 300 msec.

Measuring Input
AC Voltage/Current input signal, sine wave or distorted wave form upto 31st Harmonics.
Measurement of instantaneous values of more than 50 quantities (Voltage, Current, Power (W, VAR, VA), Power Factor, Phase Angle, Frequency, System and Per Phase Demand, THD, System and Per Phase Energy (Wh, VArh, Vah)).

Best In Class Accuracy
Transducer Class 0.2 Accuracy as per IEC 60688.
Active Energy Class 0.5s as per 62053-22.



USB Communication
Transducer can be configured onsite using USB.
USB is self-powered so device configuration is possible, both with and without auxiliary supply.

RS485 Communication Interface
Optional MODBUS RS-485 interface for monitoring and configuration purpose is also provided.

Programmable Input/Output
Transducer Input and Outputs can be programmed on-site using USB or RS-485 Interface.

Compliance to International Safety standards
Compliance to International Safety standard IEC 61010-1-2010

EMC Compatibility
Compliance to International standard IEC 61326.

Symbols and their meaning

X	Input Parameter Voltage, Current, Powers, Power Factor, Phase angle, Frequency and many more.
X0	Start value of input
X1	Elbow value of input
X2	End value of input
Y	Output DC Voltage / DC Current
Y0	Start value of output DC Voltage / DC Current
Y1	Elbow value of output DC Voltage / DC Current
Y2	End value of output DC Voltage / DC Current
R_N	Rated value of output burden
F_N	Nominal Frequency

Technical Specifications

Measured Parameter
Please refer Table 1 for List of measured parameters.

Network Type Supported by transducer : Single Phase / 3 phase 3 wire Unbalanced / 3 phase 4 wire Unbalanced / (U12 I1) 3 Phase Balanced / (U23 I1) 3 Phase Balanced / (U31 I1) 3 Phase Balanced / 3 Phase 3 wire Balanced / 3 Phase 4 wire Balanced

Nominal Voltage Input(UN)

Nominal input Voltage (AC RMS)	100 V ≤ UN ≤ 600 VL-L
(PT Secondary range)	
PT Primary range	100V to 1200 KVL-L
Nominal Frequency F_N	40 Hz to 70 Hz
Nominal input Voltage burden	< 0.3 VA per phase at UN
Overload Capacity	1.5 * UN continuously, 2 * UN for 1 second, repeated 10 times at 10 seconds intervals

Nominal Current Input(I_N)

Nominal input Current (AC RMS)	1 A ≤ I_N ≤ 5 A
(CT Secondary range)	
CT Primary range	1 A to 9999 A
Nominal Frequency F_N	40 Hz to 70 Hz
Nominal input Current burden	< 0.3 VA per phase at IN
Overload Capacity	2 * I_N continuously, 20 * I_N for 1 second, repeated 5 times at 5 seconds intervals.

Allowed measuring range end values X2 (calibration factor Xc)

Current Input	0.50 < (X2/Rated Value)< 2.0
Voltage Input	0.60 < (X2/Rated Value)< 1.5
Power Input	0.30 < (X2/Rated Value)< 1.5
Frequency Input	40 Hz < X2 < 70Hz
Power Factor	0 < X2 < 1
Phase Angle	0 < X2 < 175 Deg

Rated value is the nominal value of selected input parameter as per Network type.

Measuring Output Y(For 4 Analog Outputs)

Output type	Load independent DC Voltage , DC Current On site selectable through USB or RS-485 Interface.
Load independent DC output	Unipolar 0…20mA / 4…20mA OR 0…10V. Bipolar -20mA....0....+20mA OR -10V....0....+10V
Output burden with DC current output signal	0 ⩽ R ⩽15V/Y2
Output burden with DC voltage output signal	Y2/(2 mA) ⩽ R ⩽∞
Current limit under overload R=0	⩽1.25 * Y2 with current output ⩽ 100 mA with voltage output
Voltage limit under R=∞	⩽ 1.25 * Y2 with voltage output ⩽ 30 V with current output
Residual Ripple in Output signal	⩽ 0.4% pk-pk
Response Time	⩽ 300 ms

Auxiliary Power Supply

AC/DC Auxiliary Supply	85V… 285 VAC-DC (240V Nominal Value)
AC Auxiliary supply frequency range	45 to 65 Hz
Auxiliary supply consumption	< 10VA

Accuracy of Analog Output as per Selected input Parameter(Acc. to IEC / EN 60688)

Reference Value	Output end Value Y2 (Voltage or Current)
Voltage	± 0.2C
Current	± 0.2C
Frequency	± 0.2C
Power Factor / Phase Angle	± 0.5C
Active Power	± 0.2C
Reactive Power	± 0.5C
Apparent Power	± 0.2C

Factor C (The highest value applies if calculated C is less than 1,then C=1 applies)

Linear characteristics

$$C = \frac{Y2-Y0}{X2-X0} \times \frac{X2}{Y2} \quad \text{or } C=1$$

Bent characteristics

For $X0 \leq X \leq X1$ $\quad C = \frac{Y1-Y0}{X1-X0} \times \frac{X2}{Y2}$ or $C = 1$

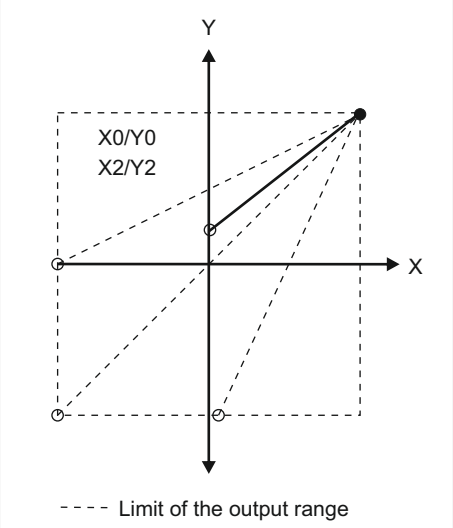
For $X1 \leq X \leq X2$ $\quad C = \frac{Y2-Y1}{X2-X1} \times \frac{X2}{Y2}$ or $C = 1$

Reference conditions for Accuracy:

Ambient temperature	23°C +/- 1°C
Pre-conditioning	30 min acc. to IEC / EN 60688
Input Variable	Voltage Rated / Current Rated
Input waveform	Sinusoidal, Distortion factor 0.005
Input signal frequency	50 or 60Hz
Active / Reactive factor	Cos Φ=1 resp. Sin Φ = 1
For Phase Angle & Power Factor Transducer	Reference Value For Phase angle = 90° For power factor = 0.5
Auxiliary supply voltage	At nominal range
Output Load	Rn = 7.5 V / Y2 ± 1% With DC current output signal
	Rn = Y2 / 1 mA ± 1% With DC voltage output signal
Miscellaneous	Acc. to IEC / EN 60688

Output Characteristics

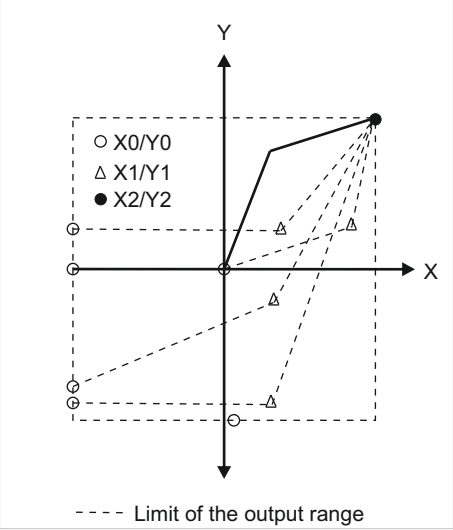
Example of setting with Linear Characteristics



X0 = Start value of input
Y0 = Start value of output
X1 = Elbow value of input

Y1 = Elbow value of output
X2 = End value of input
Y2 = End value of output

Example of setting with bent Characteristics



Additional Error
Temperature influence — ± 0.2%/10°C

Influence of Variations
As per IEC / EN 60688 standard.
Output stability — < 30 min

Safety

Protection Class	II (Protection Isolated, EN 61010)
Protection	IP 40, housing according to EN 60 529 IP 20 ,terminal according to EN 60 529
Pollution degree	2
Installation Category	III
Insulation Voltage	1min. (EN 61010-1) 3.3kV RMS, Input versus outer surface 3.3kV RMS, Input versus all other circuits 3.3kV RMS, Auxiliary supply versus outer surface and output 500V RMS, Output versus output versus each other versus outer surface.

Installation Data

Mechanical Housing	Lexan 940 (polycarbonate) Flammability Class V-0 acc. To UL 94, self extinguishing, non dripping, free of halogen
Mounting position	Rail mounting / wall mounting
Weight	Approx. 0.5kg

Connection Terminal

Connection Element	Conventional Screw type terminal with indirect wire pressure
Permissible cross section of the connection lead	≤ 4.0 mm² single wire or 2 x 2.5 mm² fine wire

Environmental

Operating temperature	-10°C...23°C...55°C(usage Group II)
Storage temperature	-30 °C to 80 °C
Relative humidity	0....95%RH(Non Condensing)
Altitude	2000m max

Ambient tests

EN 60068-2-6	Vibration
Acceleration	± 2 g
Frequency range	10....150...10Hz
Rate of frequency sweep	1 octave/minute
Number of cycles	10, in each of the three axes
EN 60068-2-7	Shock
Acceleration	3 x 50g 3 shocks in each direction

IEC 61326-1: 2012, Table — Electromagnetic compatibility

LED Indication

ON LED	Aux.supply healthy condition	Green LED continuous ON
	Transducer Powered from USB	Red LED continuous ON
AL-1	Alarm 1 trigger Condition not occur	Green LED continuous ON
	Alarm 1 trigger Condition occurred	Red LED continuous ON
AL-2	Alarm 2 trigger Condition not occur	Green LED continuous ON
	Alarm 2 trigger Condition occurred	Red LED continuous ON
AL-3	Alarm 3 trigger Condition not occur	Green LED continuous ON
	Alarm 3 trigger Condition occurred	Red LED continuous ON
AL-4	Alarm 4 trigger Condition not occur	Green LED continuous ON
	Alarm 4 trigger Condition occurred	Red LED continuous ON
Impulse LED	Energy monitoring and measurement	Red LED Blinking as per energy

Electrical Connections

Connection	Terminal details	
Measuring Voltage Input	UL1 UL2 UL3 N	2 5 8 11
Auxilliary Power supply	~ , + ~ , -	13 14
Analog output - 1	+ -	22 21
Analog output - 2	+ -	20 19
Relay output - 1	NO COM	28 27
RS-485	B A G	29 30 31

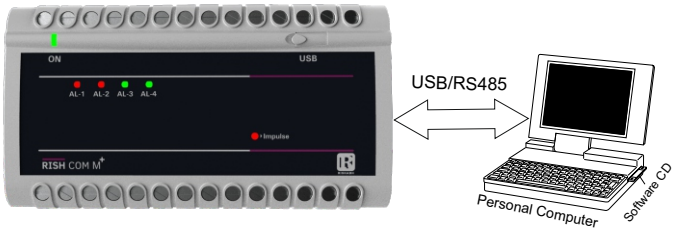
Connection	Terminal details	
Measuring Current Input	I1 I1' I2 I2' I3 I3'	1 3 4 6 7 9
Analog output - 3	+ -	18 17
Analog output - 4	+ -	16 15
Relay output - 2	NO COM	26 25

Programming

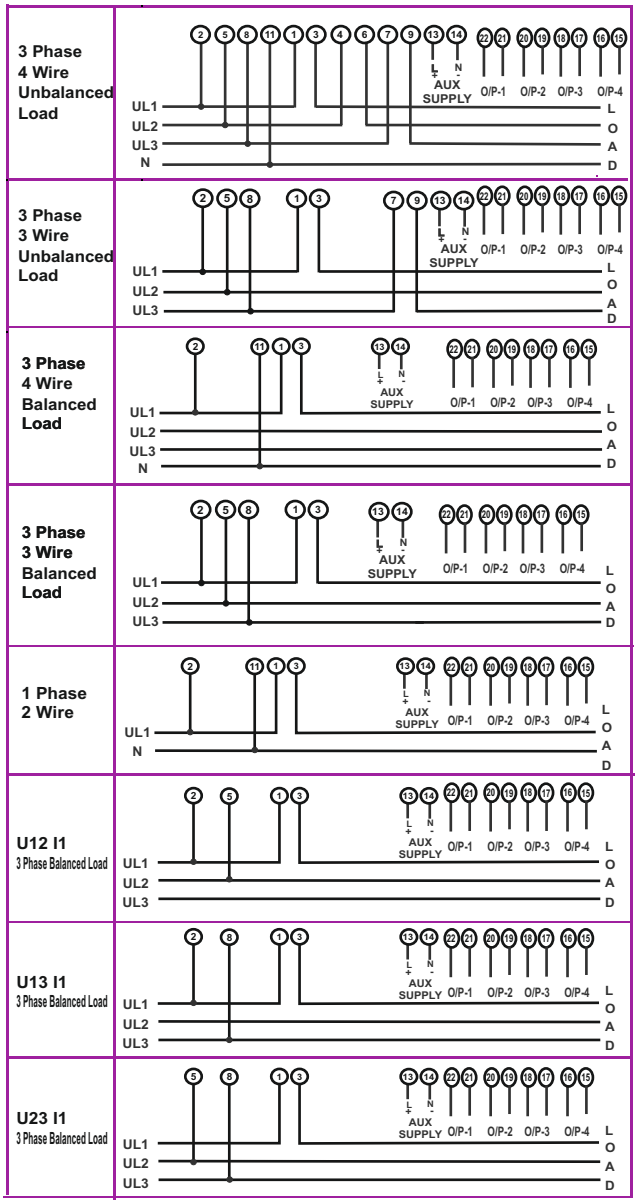
Programming of transducer can be done in 2 ways

- Programming Via Optional RS485(MODBUS) Communication.
- Programming Via USB port at front of the Transducer using USB cable. The programming by this method can also be done without aux supply(power from USB).
- For Programming the transducer by any of the above two methods configuration software can be used which is provided on CD along with transducer.

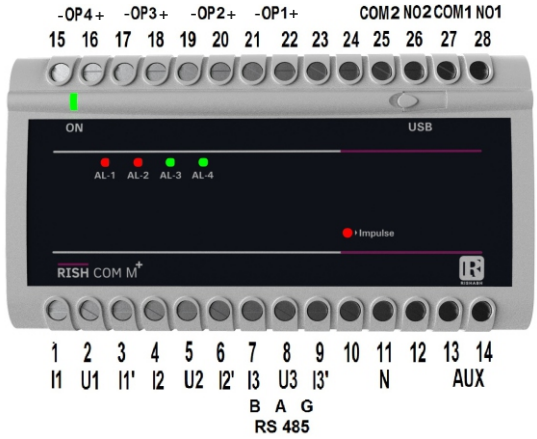
Transducer



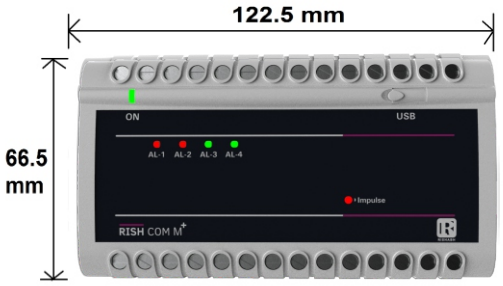
Electrical Networks

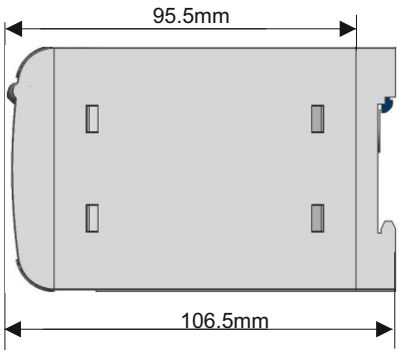


Terminal Details:



Dimensions Details:





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Measured Parameter System wise: Table 1

✓ : Available × : Not Available

SR. No	Parameters	3P4W UNBL	3P3W UNBL	1PH 2W	3P4W BAL	3P3W BAL	3P3W U12I1	3P3W U23I1	3P3W U31I1
1	System Voltage	✓	✓	✓	✓	✓	✓	✓	✓
2	Per Phase (L1,L2,L3) Voltage	✓	×	×	×	×	×	×	×
3	Phase to Phase(L12,L23,L31) Voltage	✓	✓	×	×	×	×	×	×
4	System Current	✓	✓	✓	✓	✓	✓	✓	✓
5	Per Phase (L1,L2,L3) Current	✓	×	×	×	×	×	×	×
6	System Active Power	✓	✓	✓	✓	✓	✓	✓	✓
7	System Re-active Power	✓	✓	✓	✓	✓	✓	✓	✓
8	System Apparent Power	✓	✓	✓	✓	✓	✓	✓	✓
9	Per Phase (L1,L2,L3) Active Power	✓	×	×	×	×	×	×	×
10	Per Phase (L1,L2,L3) Re-active Power	✓	×	×	×	×	×	×	×
11	Per Phase (L1,L2,L3) Apparent Power	✓	×	×	×	×	×	×	×
12	System Current Demand	✓	✓	✓	✓	✓	✓	✓	✓
13	System kVA Demand	✓	✓	✓	✓	✓	✓	✓	✓
14	System Import kW Demand	✓	✓	✓	✓	✓	✓	✓	✓
15	System Export kW Demand	✓	✓	✓	✓	✓	✓	✓	✓
16	System Ind. Var Demand	✓	✓	✓	✓	✓	✓	✓	✓
17	System Cap. Var Demand	✓	✓	✓	✓	✓	✓	✓	✓
18	System Max kVA Demand	✓	✓	✓	✓	✓	✓	✓	✓
19	System Max Imp kW Demand	✓	✓	✓	✓	✓	✓	✓	✓
20	System Max Exp kW Demand	✓	✓	✓	✓	✓	✓	✓	✓
21	System Max Ind Var Demand	✓	✓	✓	✓	✓	✓	✓	✓
22	System Max Cap Var Demand	✓	✓	✓	✓	✓	✓	✓	✓
23	System Max Current Demand	✓	✓	✓	✓	✓	✓	✓	✓
24	Per Phase (L1,L2,L3) Current Demand	✓	×	×	×	×	×	×	×
25	Per Phase (L1,L2,L3) kVA Demand	✓	×	×	×	×	×	×	×
26	Per Phase (L1,L2,L3) Import kW Demand	✓	×	×	×	×	×	×	×
27	Per Phase (L1,L2,L3) Export kW Demand	✓	×	×	×	×	×	×	×

continued....

✓ : Available × : Not Available

SR. No	Parameters	3P4W UNBL	3P3W UNBL	1PH 2W	3P4W BAL	3P3W BAL	3P3W U12I1	3P3W U23I1	3P3W U31I1
28	Per Phase (L1,L2,L3) Inductive Var Demand	✓	×	×	×	×	×	×	×
29	Per Phase (L1,L2,L3) Capacitive Var Demand	✓	×	×	×	×	×	×	×
30	Per Phase (L1,L2,L3) Max kVA Demand	✓	×	×	×	×	×	×	×
31	Per Phase (L1,L2,L3) Max Import kW Demand	✓	×	×	×	×	×	×	×
32	Per Phase (L1,L2,L3) Max Export kW Demand	✓	×	×	×	×	×	×	×
33	Per Phase (L1,L2,L3) Max Ind Var Demand	✓	×	×	×	×	×	×	×
34	Per Phase (L1,L2,L3) Max Cap Var Demand	✓	×	×	×	×	×	×	×
35	Per Phase (L1,L2,L3) Max Current Demand	✓	×	×	×	×	×	×	×
36	System Power Factor	✓	✓	✓	✓	✓	✓	✓	✓
37	Per Phase (L1,L2,L3) Power Factor	✓	×	×	×	×	×	×	×
38	System Phase Angle	✓	✓	✓	✓	✓	✓	✓	✓
39	Per Phase (L1,L2,L3) Phase Angle	✓	×	×	×	×	×	×	×
40	Frequency	✓	✓	✓	✓	✓	✓	✓	✓
41	RPM	✓	✓	✓	✓	✓	✓	✓	✓
42	System Import Active Energy	✓	✓	✓	✓	✓	✓	✓	✓
43	System Export Active Energy	✓	✓	✓	✓	✓	✓	✓	✓
44	System Ind Reactive Energy	✓	✓	✓	✓	✓	✓	✓	✓
45	System Cap Reactive Energy	✓	✓	✓	✓	✓	✓	✓	✓
46	System Apparent Energy	✓	✓	✓	✓	✓	✓	✓	✓
47	Per Phase (L1,L2,L3) Import Active Energy	✓	×	×	×	×	×	×	×
48	Per Phase (L1,L2,L3) Export Active Energy	✓	×	×	×	×	×	×	×
49	Per Phase (L1,L2,L3) Inductive Reactive Energy	✓	×	×	×	×	×	×	×
50	Per Phase (L1,L2,L3) Capacitive Reactive Energy	✓	×	×	×	×	×	×	×

continued....

SR. No	Parameters	3P4W UNBL	3P3W UNBL	1PH 2W	3P4W BAL	3P3W BAL	3P3W U12I1	3P3W U23I1	3P3W U31I1
51	Per Phase (L1, L2, L3) Apparent Energy	✓	✗	✗	✗	✗	✗	✗	✗
52	Neutral Current	✓	✗	✗	✗	✗	✗	✗	✗
53	System Voltage THD	✓	✓	✓	✓	✓	✓	✓	✓
54	Per Phase (L1, L2, L3) Voltage THD	✓	✗	✗	✗	✗	✗	✗	✗
55	System Current THD	✓	✓	✓	✓	✓	✓	✓	✓
56	Per Phase (L1, L2, L3) Current THD	✓	✗	✗	✗	✗	✗	✗	✗
57	Per Phase (L1, L2, L3) Individual Voltage Harmonics	✓	✓	✗	✗	✗	✗	✗	✗
58	Per Phase (L1, L2, L3) Individual Current Harmonics	✓	✓	✗	✗	✗	✗	✗	✗
59	Run Hour	✓	✓	✓	✓	✓	✓	✓	✓
60	On Hour	✓	✓	✓	✓	✓	✓	✓	✓
61	Number of Interruptions	✓	✓	✓	✓	✓	✓	✓	✓
62	Phase Reversal Indication	✓	✗	✗	✗	✗	✗	✗	✗
63	Current Reversal Indication	✓	✗	✓	✓	✓	✓	✓	✓
64	Phase Absent Indication	✓	✗	✗	✗	✗	✗	✗	✗

Ordering Information

CM44	X	X	X	X	X	X
Voltage Input Un: (Phase/Phase-to-Phase)						
3 Phase 100-600 VLL	1					
Current Input In: (onsite programmable)						
1A/5A		1				
Supply Voltage:						
85...285V AC/DC			1			
Output Type:						
4 Analog Outputs and 2 Relays				1		
2 Analog Outputs and 2 Relays				2		
4 Analog Outputs				4		
Rs485 Communication:						
With RS485 communication					1	
Without RS485 communication					2	
USB Communication:						
With USB communication						1

Order Code Example:
CM44-1112110000000
CM44- 3 Phase 100-600 VLL, 1A/5A, 85...285V AC/DC, 2 Analog Outputs and 2 Relays, With Rs485 communication, USB communication.

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