

## TCU 100 Standalone Product



- Offers a wide range of resources: DPDT relays, SPDT Relays, Voltmeters, Ammeters, Digital IOs, Frequency IOs, Arbitrary Voltage Generators, CAN FD, LIN and KLINE communication channels.
- Real-Time commands sequencer and controller.
- External synchronization clock support.
- Ethernet TCP, USB-C and RS-232/RS422 communication interfaces.
- Built in SD Card to store the configurations and data acquisitions.
- Ready to use C# and LabVIEW APIs.

### Overview

The TCU100 is an acquisition station specifically designed to offer a wide range of resources with multiple channels working simultaneously. It has relays and multiplexers, voltmeters, ammeters, digital I/Os, signal sources, CAN FD/LIN/KLINE communication interfaces, and handles test sequencing and results logging to an external computer and the built in SD Card.

The TCU100 is a remotely operated device accessible via Ethernet TCP, USB C and RS232/RS422 communication interfaces. It can also work as a standalone device, running the action sequences on the resources and logging the data in the SD Card without a connection to a controller.

**Detailed Specifications:**

DC Input	Value	Unit
Maximum POWER	80	Watts
Voltage Range	24 Volts DC	V
Maximum Voltage between VBAT and GROUND	35 Volts	V
Accuracy	±0.5	%

Multiplexer	Value	Unit
Relay type DPDT		
Channels	15	
Relay Type SPDT		
Channels	15	

VOLTAGE MEASUREMENT	Value	Unit
Input Impedance	100	kΩ
Maximum Common Voltage range	± 70	V
Maximum Differential Voltage range	± 70	V
Accuracy	± 0.05	%
Resolution	16 bits, 1 LSB = 60	μV

Current Measurement	Value	Unit
Input Impedance	400	kΩ
Maximum Common Voltage range	-2 to 60	V
Maximum Differential Voltage range	± 40	mV
Accuracy	± 0.1	%
Resolution	16 bits, 1 LSB = 2	μV

Digital Input	Value	Unit
Channel Number	10	
Input Impedance	100	kΩ

Input Voltage Range	± 60	V
Adjustable Threshold	-10 to +20	V
Threshold resolution	3	mV
Hysteresis	17	mV

Digital Output	Value	Unit
Channel Number	10	
On resistance	60	mΩ
Off leakage current	75	μA
Maximum Voltage	35	V
Maximum Current	2	A

Frequency Inputs	Value	Unit
Channel Number	4	
Frequency range	0.1 - 100K	Hz
Duty Cycle Range	0.5 to 99.5	%
Input Impedance	100	kΩ
Input Voltage Range	± 60	V
Adjustable Threshold	-10 to +20	V
Threshold Resolution	16 bits, 1 LSB = 2	mV
Hysteresis	17V	mV

Frequency Outputs	Value	Unit
Channel Number	8	
Frequency Range	0.9 to 100 K	Hz
Duty Cycle Range	0.5 to 99.5	%
Slew Rate	<10 us	T
Output Voltage Range	± 20	V
Output Current	± 20	mA
Resolution	16 bits, 1 LSB = 60	μV

Voltage Output	Value	Unit
Channel Number	8	
Output Voltage Range	$\pm 20$	V
Output Current	$\pm 20$	mA
Resolution	16 bits, 1 LSB = 60	$\mu$ V

Arbitrary Waveform Generator	Value	Unit
Channel Number	8	
Output Voltage Range	$\pm 20$	V
Output Current	$\pm 20$	mA
Standard waveforms frequency range	0.2 to 100K	Hz
Resolution	16 bits, 1 LSB = 60	$\mu$ V

### CAN FD INTERFACE

- Compliant with ISO 11898-2 Data and Physical Layer and ISO15765-2 Transport Protocol layer. Configurable nominal bitrate up to 1 Mbit/s.
- Configurable data bitrate up to 8 Mbit/s.

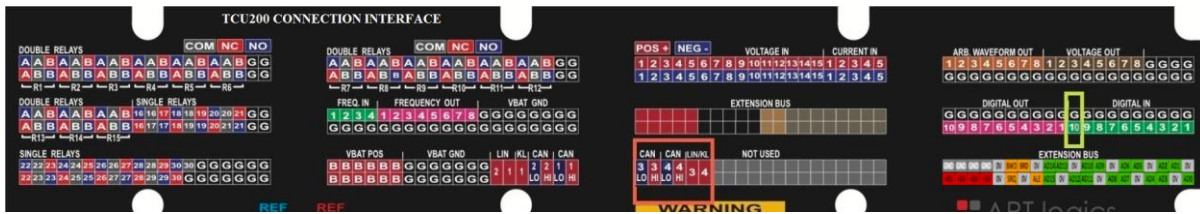
### LIN INTERFACE

- Compliant with Local Interconnect Network (LIN) Bus Specifications 1.3, 2.0, 2.1 and compliant to SAE J2602 with a configurable bitrate.
- Internal pull-up resistor and diode.

### K-LINE INTERFACE

- Compliant with the ISO 9141 with a configurable bitrate.
- Internal pull-up resistor and diode.

### External Connection:



**Table1 – Connector CN1 and CN2 Connection List**

PIN CN1	NUMBER	NAME	FUNCTION	PIN CN2	NUMBER	NAME	FUNCTION
1		FREQ IN 1	FREQUENCY IN	1		DIG_IN 1	DIGITAL IN
2		GND	GROUND	2		GND	GROUND
3		FREQ IN 2	FREQUENCY IN	3		DIG_IN 2	DIGITAL IN
4		GND	GROUND	4		GND	GROUND
5		FREQ IN 3	FREQUENCY IN	5		DIG_IN 3	DIGITAL IN
6		GND	GROUND	6		GND	GROUND
7		FREQ IN 4	FREQUENCY IN	7		DIG_IN 4	DIGITAL IN
8		GND	GROUND	8		GND	GROUND
9		FREQ OUT 1	FREQUENCY OUT	9		DIG_IN 5	DIGITAL IN
10		GND	GROUND	10		GND	GROUND
11		FREQ OUT 2	FREQUENCY OUT	11		DIG_IN 6	DIGITAL IN
12		GND	GROUND	12		GND	GROUND
13		FREQ OUT 3	FREQUENCY OUT	13		DIG_IN 7	DIGITAL IN
14		GND	GROUND	14		GND	GROUND
15		FREQ OUT 4	FREQUENCY OUT	15		DIG_IN 8	DIGITAL IN
16		GND	GROUND	16		GND	GROUND
17		FREQ OUT 5	FREQUENCY OUT	17		DIG_IN 9	DIGITAL IN
18		GND	GROUND	18		GND	GROUND
19		FREQ OUT 6	FREQUENCY OUT	19		DIG_IN 10	DIGITAL IN
20		GND	GROUND	20		GND	GROUND
21		FREQ OUT 7	FREQUENCY OUT	21		DIG_OUT 1	DIGITAL OUT
22		GND	GROUND	22		GND	GROUND
23		FREQ OUT 8	FREQUENCY OUT	23		DIG_OUT 2	DIGITAL OUT
24		GND	GROUND	24		GND	GROUND
25		GND	GROUND	25		DIG_OUT 3	DIGITAL OUT
26		GND	GROUND	26		GND	GROUND
27		GND	GROUND	27		DIG_OUT 4	DIGITAL OUT
28		GND	GROUND	28		GND	GROUND
29		GND	GROUND	29		DIG_OUT 5	DIGITAL OUT
30		GND	GROUND	30		GND	GROUND
31		GND	GROUND	31		DIG_OUT 6	DIGITAL OUT
32		GND	GROUND	32		GND	GROUND
33		GND	GROUND	33		DIG_OUT 7	DIGITAL OUT

34	GND	GROUND	34	GND	GROUND
35	GND	GROUND	35	DIG_OUT 8	DIGITAL OUT
36	GND	GROUND	36	GND	GROUND
37	GND	GROUND	37	DIG_OUT 9	DIGITAL OUT
38	GND	GROUND	38	GND	GROUND
39	GND	GROUND	39	DIG_OUT 10	DIGITAL OUT
40	GND	GROUND	40	GND	GROUND

**Table2 – Connector CN3 and CN4 Connection List**

PIN NUMBER CN3	NAME	FUNCTION	PIN NUMBER CN4	NAME	FUNCTION
1	AWG_OUT 1	Arbitrarie wave Forme Generator	1	CAN1_High	BUS CAN FD High
2	GND	GROUND	2	CAN1_High	BUS CAN FD High
3	AWG_OUT 2	Arbitrarie wave Forme Generator	3	CAN1_Low	BUS CAN FD Low
4	GND	GROUND	4	CAN1_Low	BUS CAN FD Low
5	AWG_OUT 3	Arbitrarie wave Forme Generator	5	CAN1_High	BUS CAN FD High
6	GND	GROUND	6	CAN1_High	BUS CAN FD High
7	AWG_OUT 4	Arbitrarie wave Forme Generator	7	CAN1_Low	BUS CAN FD Low
8	GND	GROUND	8	CAN1_Low	BUS CAN FD Low
9	AWG_OUT 5	Arbitrarie wave Forme Generator	9	K_LINE	BUS KLINE
10	GND	GROUND	10	K_LINE	BUS KLINE
11	AWG_OUT 6	Arbitrarie wave Forme Generator	11	LIN_1	BUS LIN 1
12	GND	GROUND	12	LIN_1	BUS LIN 1
13	AWG_OUT 7	Arbitrarie wave Forme Generator	13	LIN_2	BUS LIN 2
14	GND	GROUND	14	LIN_2	BUS LIN 2
15	AWG_OUT 8	Arbitrarie wave Forme Generator	15	GND	GROUND
16	GND	GROUND	16	GND	GROUND
17	VOUT 1	VOLTAGE OUT	17	GND	GROUND
18	GND	GROUND	18	GND	GROUND
19	VOUT 2	VOLTAGE OUT	19	GND	GROUND
20	GND	GROUND	20	GND	GROUND
21	VOUT 3	VOLTAGE OUT	21	GND	GROUND
22	GND	GROUND	22	GND	GROUND
23	VOUT 4	VOLTAGE OUT	23	GND	GROUND
24	GND	GROUND	24	GND	GROUND
25	VOUT 5	VOLTAGE OUT	25	GND	GROUND
26	GND	GROUND	26	GND	GROUND
27	VOUT 6	VOLTAGE OUT	27	GND	GROUND
28	GND	GROUND	28	GND	GROUND
29	VOUT 7	VOLTAGE OUT	29	VBAT	GROUND
30	GND	GROUND	30	VBAT	POWER SUPPLIER

31	VOUT 8	VOLTAGE OUT	31	VBAT	POWER SUPPLIER
32	GND	GROUND	32	VBAT	POWER SUPPLIER
33	GND	GROUND	33	VBAT	POWER SUPPLIER
34	GND	GROUND	34	VBAT	POWER SUPPLIER
35	GND	GROUND	35	VBAT	POWER SUPPLIER
36	GND	GROUND	36	VBAT	POWER SUPPLIER
37	GND	GROUND	37	VBAT	POWER SUPPLIER
38	GND	GROUND	38	VBAT	POWER SUPPLIER
39	GND	GROUND	39	VBAT	POWER SUPPLIER
40	GND	GROUND	40	VBAT	POWER SUPPLIER

**Table3 – Connector CN5**

<b>PIN NUMBER CN5</b>	<b>NAME</b>	<b>FUNCTION</b>
1	VIN1+	Voltage in +
2	VIN1-	Voltage in -
3	VIN2+	Voltage in +
4	VIN2-	Voltage in -
5	VIN3+	Voltage in +
6	VIN3-	Voltage in -
7	VIN4+	Voltage in +
8	VIN4-	Voltage in -
9	VIN5+	Voltage in +
10	VIN5-	Voltage in -
11	VIN6+	Voltage in +
12	VIN6-	Voltage in -
13	VIN7+	Voltage in +
14	VIN7-	Voltage in -
15	VIN8+	Voltage in +
16	VIN8-	Voltage in -
17	VIN9+	Voltage in +
18	VIN9-	Voltage in -
19	VIN10+	Voltage in +
20	VIN10-	Voltage in -
21	VIN11+	Voltage in +
22	VIN11-	Voltage in -
23	VIN12+	Voltage in +
24	VIN12-	Voltage in -
25	VIN13+	Voltage in +
26	VIN13-	Voltage in -
27	VIN14+	Voltage in +
28	VIN14-	Voltage in -
29	VIN15+	Voltage in +
30	VIN15-	Voltage in -
31	CIN1+	Current In +
32	CIN1-	Current In -
33	CIN2+	Current In +
34	CIN2-	Current In -

35	CIN3+	Current In +
36	CIN3-	Current In -
37	CIN4+	Current In +
38	CIN4-	Current In -
39	CIN5+	Current In +
40	CIN5-	Current In -

**Table4 – Connector CN7 and CN8 Connection List**

PIN CN7	NUMBER	NAME	FUNCTION	PIN CN8	NUMBER	NAME	FUNCTION
1		RLY01A_NO	Relay 1 NCA	1		RLY13A_NO	Relay 7 NCA
2		RLY01A_NC	Relay1_NOA	2		RLY13A_NC	Relay 7_NOA
3		RLY01A_COM	Relay1_COMA	3		RLY13A_COM	Relay 7_COMA
4		RLY02B_NO	Relay 1 NCB	4		RLY14B_NO	Relay 7 NCB
5		RLY02B_NC	Relay1_NOB	5		RLY14B_NC	Relay 7_NOB
6		RLY02B_COM	Relay1_COMB	6		RLY14B_COM	Relay 7_COMB
7		RLY03A_NO	Relay 2 NCA	7		RLY15A_NO	Relay 8 NCA
8		RLY03A_NC	Relay 2_NOA	8		RLY15A_NC	Relay 8_NOA
9		RLY03A_COM	Relay 2_COMA	9		RLY15A_COM	Relay 8_COMA
10		RLY04B_NO	Relay 2 NCB	10		RLY16B_NO	Relay 8 NCA
11		RLY04B_NC	Relay 2_NOB	11		RLY16B_NC	Relay 8_NOA
12		RLY04B_COM	Relay 2_COMB	12		RLY16B_COM	Relay 8_COMA
13		RLY05A_NO	Relay 3 NCA	13		RLY17A_NO	Relay 9 NCB
14		RLY05A_NC	Relay 3_NOA	14		RLY17A_NC	Relay 9_NOB
15		RLY05A_COM	Relay 3_COMA	15		RLY17A_COM	Relay 9_COMB
16		RLY06B_NO	Relay 3 NCB	16		RLY18B_NO	Relay 9 NCA
17		RLY06B_NC	Relay 3_NOB	17		RLY18B_NC	Relay 9_NOA
18		RLY06B_COM	Relay 3_COMB	18		RLY18B_COM	Relay 9_COMA
19		RLY07A_NO	Relay 4 NCA	19		RLY19A_NO	Relay 10 NCB
20		RLY07A_NC	Relay 4_NOA	20		RLY19A_NC	Relay 10_NOB
21		RLY07A_COM	Relay 4_COMA	21		RLY19A_COM	Relay 10_COMB
22		RLY08B_NO	Relay 4 NCB	22		RLY20B_NO	Relay 10_NCA
23		RLY08B_NC	Relay 4_NOB	23		RLY20B_NC	Relay 10_NOA
24		RLY08B_COM	Relay 4_COMB	24		RLY20B_COM	Relay 10_COMA
25		RLY09A_NO	Relay 5 NCA	25		RLY21A_NO	Relay 11 NCB
26		RLY09A_NC	Relay 5_NOA	26		RLY21A_NC	Relay 11_NOB
27		RLY09A_COM	Relay 5_COMA	27		RLY21A_COM	Relay 11_COMB
28		RLY10B_NO	Relay 5 NCB	28		RLY22B_NO	Relay 11 NCA
29		RLY10B_NC	Relay 5_NOB	29		RLY22B_NC	Relay 11_NOA
30		RLY10B_COM	Relay 5_COMB	30		RLY22B_COM	Relay 11_COMA
31		RLY011A_NO	Relay 6 NCA	31		RLY23A_NO	Relay 12 NCB
32		RLY011A_NC	Relay 6_NOA	32		RLY23A_NC	Relay 12_NOB
33		RLY011A_COM	Relay 6_COMA	33		RLY23A_COM	Relay 12_COMB



34	RLY012B_NO	Relay 6_NCB	34	RLY24B_NO	Relay 12_NCA
35	RLY012B_NC	Relay 6_NOB	35	RLY24B_NC	Relay 12_NOA
36	RLY012B_COM	Relay 6_COMB	36	RLY24B_COM	Relay 12_COMA
37	GND	GROUND	37	GND	GROUND
38	GND	GROUND	38	GND	GROUND
39	GND	GROUND	39	GND	GROUND
40	GND	GROUND	40	GND	GROUND

**Table5 – Connector CN9 and CN10 Connection List**

PIN CN9	NUMBER	NAME	FUNCTION	NUMBER CN10	NAME	FUNCTION
1		RLY25A_NO	Relay 13_NCA	1	RLY37_NO	RLY22_NO
2		RLY25A_NC	Relay13_NOA	2	RLY37_NC	RLY22_NC
3		RLY25A_COM	Relay13_COMA	3	RLY37_COM	RLY22_COM
4		RLY26B_NO	Relay 13_NCB	4	RLY38_NO	RLY23_NO
5		RLY26B_NC	Relay13_NOB	5	RLY38_NC	RLY23_NC
6		RLY26B_COM	Relay13_COMB	6	RLY38_COM	RLY23_COM
7		RLY27A_NO	Relay14_NCA	7	RLY39_NO	RLY24_NO
8		RLY27A_NC	Relay 14_NOA	8	RLY39_NC	RLY24_NC
9		RLY27A_COM	Relay 14_COMA	9	RLY39_COM	RLY24_COM
10		RLY28B_NO	Relay 14_NCB	10	RLY40_NO	RLY25_NO
11		RLY28B_NC	Relay 14_NOB	11	RLY40_NC	RLY25_NC
12		RLY28B_COM	Relay 14_COMB	12	RLY40_COM	RLY25_COM
13		RLY29A_NO	Relay 15_NCA	13	RLY41_NO	RLY26_NO
14		RLY29A_NC	Relay 15_NOA	14	RLY41_NC	RLY26_NC
15		RLY29A_COM	Relay 15_COMA	15	RLY41_COM	RLY26_COM
16		RLY30B_NO	Relay 15_NCB	16	RLY42_NO	RLY27_NO
17		RLY30B_NC	Relay 15_NOB	17	RLY42_NC	RLY27_NC
18		RLY30B_COM	Relay 15_COMB	18	RLY42_COM	RLY27_COM
19		RLY31_NO	RLY16_NO	19	RLY43_NO	RLY28_NO
20		RLY31_NC	RLY16_NC	20	RLY43_NC	RLY28_NC
21		RLY31_COM	RLY16_COM	21	RLY43_COM	RLY28_COM
22		RLY32_NO	RLY17_NO	22	RLY44_NO	RLY29_NO
23		RLY32_NC	RLY17_NC	23	RLY44_NC	RLY29_NC
24		RLY32_COM	RLY17_COM	24	RLY44_COM	RLY29_COM
25		RLY33_NO	RLY18_NO	25	RLY45_NO	RLY30_NO
26		RLY33_NC	RLY18_NC	26	RLY45_NC	RLY30_NC
27		RLY33_COM	RLY18_COM	27	RLY45_COM	RLY30_COM
28		RLY34_NO	RLY19_NO	28	GND	GROUND
29		RLY34_NC	RLY19_NC	29	GND	GROUND
30		RLY34_COM	RLY19_COM	30	GND	GROUND
31		RLY35_NO	RLY20_NO	31	GND	GROUND
32		RLY35_NC	RLY20_NC	32	GND	GROUND
33		RLY35_COM	RLY20_COM	33	GND	GROUND
34		RLY36_NO	RLY21_NO	34	GND	GROUND

35	<i>RLY36_NC</i>	<i>RLY21_NC</i>	35	<i>GND</i>	<i>GROUND</i>
36	<i>RLY36_COM</i>	<i>RLY21_COM</i>	36	<i>GND</i>	<i>GROUND</i>
37	<i>GND</i>	<i>GROUND</i>	37	<i>GND</i>	<i>GROUND</i>
38	<i>GND</i>	<i>GROUND</i>	38	<i>GND</i>	<i>GROUND</i>
39	<i>GND</i>	<i>GROUND</i>	39	<i>GND</i>	<i>GROUND</i>
40	<i>GND</i>	<i>GROUND</i>	40	<i>GND</i>	<i>GROUND</i>

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### **Power Requirement**

#### **DC power supply:**

24VDC, 90 mA

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### **Physical:**

#### **Dimension:**

**L\*W = 126mm\*114mm**

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## Environmental

The TCU100 is intended for indoor use only but may be used outdoors if installed in a suitable enclosure. Refer to the manual for more information about meeting these specifications.

Operating temperature	10 ~ 35
Storage temperature	-40 ~ +85
Ingress protection (IP code)	none
Operating humidity	10-90% RH non condensing
Storage humidity	5-95% RH non condensing

## Support and Services

### Calibration

ART logics measurement hardware is calibrated to ensure measurement accuracy and verify that the device meets its published specifications. To ensure the ongoing accuracy of the measurement hardware, ART logics offers basic or detailed recalibration service.