

Specifications

Flange type Torque Transducer by Optical Transformer method

★ Composition apparatus

- ① Torque Transducer Model: TMHSB-□NM
- ② Exclusive signal cable Model: CAC-176D-*M (selectable from 10m, 20m, 30m) 【Option】

★ Spec. of torque transducer



Model(Capacity indicated)	100NM	200NM	300NM	500NM	1KNM	2KNM	3KNM	5KNM	10KNM		
Performance											
Rated capacity(R.C.)	±100Nm	±200Nm	±300Nm	±500Nm	±1kNm	±2kNm	±3kNm	±5kNm	±10kNm		
Safe overload	150 %R.C.										
Ultimate overload	300 %R.C.										
Rated output(R.O.)	frequency : 240±120 kHz voltage : ±10 V										
Accuracy of detected value (include Nonlinearity, Hysteresis, Repeatability)	frequency output : ±0.02 %R.O. voltage output : ±0.03 %R.O.										
Temperature											
Safe temperature range	-10 ℃ to 70 ℃										
Compensated temperature range	0 ℃ to 60 ℃										
Temperature effect on zero balance	0.02 %R.O./10 ℃										
Temperature effect on output	0.03 %LOAD/10 ℃										
Characteristics on rotation											
Maximum number of rotation[rpm]	25,000		22,000		16,000		14,000		12,000		
Noise during rotation	0.5 %R.O.p-p(WB=6kHz)										
Others											
Measurement frequency range, -3dB	6 kHz										
IP class	IP54										
Material	Rotor: Alloy steel Stator: Aluminum alloy										
Fatigue life	10 ⁷ times with rated load										
Mass[kg]	Rotor part	1.0		1.2		1.6		3.5		6.0	10.2
	Stator part	1.5									

• Frequency output is raw output that is not calibrated.
On the customer side, it is necessary to convert to the torque value [N·m] by using the value stated in the certificate.

★ Compatible standard

The TMHSB conforms to the following standards.

- EN61326-1:2013 "Electrical equipment for measurement, control, and laboratory use -EMC requirements Part 1:General requirements"
- EN50581:2012 "Immunity requirements for equipment intended to perform functions in a safety-related system(functional safety) in industrial locations"
- EN50581:2012 "Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances"(RoHS Directive)

					ミネベアミツミ株式会社 MinebeaMitsumi Inc.			単位 UNIT mm 尺度 SCALE Free	材質 MATERIAL	作成日 DATE 2020/04/25		
					センシングデバイス事業部 Sensing Device Business Unit					表面粗さ SURF.ROUGH.	品名 DESCRIPTION	
D	2020.04.25	FN20-0199	KOBAYASHI	F.IDE	APPROVED CHECKED DRAWN F.IDE K.Shibasaki Y.Kobayashi			DIMENSION L TOL <L≤6 ±0.1 6<L≤30 ±0.2 30<L≤120 ±0.3 120<L≤400 ±0.5 400<L≤1000 ±0.8 角度 DEG ±0.5	熱処理 HEAT TREAT.		OUTLINE	
C	2019.11.27	FN19-0553	S.SONG	F.IDE						型式 MODEL NAME		葉番 SHEET
B	2019.02.18	FN19-0089	KOBAYASHI	F.IDE						TMHSB		
A	2018.09.11	KN18-0387	KOBAYASHI	F.IDE						図番 DRAWING NO.		改訂 REV.
-	2018.07.03	NEW	KOBAYASHI	F.IDE						KT54835-2		
行号 MARK	日付 DATE	変更事項 REASON	ECN NO.	担当 ENGINEER	承認 APPROVED							

★ Machine characteristics(Rotor part)

Model(Capacity indicated)	100NM	200NM	300NM	500NM	1KNM	2KNM	3KNM	5KNM	10KNM
Inertia moment [kg·cm ²]	13.79	13.80	13.82	19.77	26.86	107.6	107.8	260.3	668.4
Torsion rigidity [kN·m/rad]	325.0	371.4	472.7	660.7	909.8	1515	1881	2647	4043
Torsion peculiar pitch [kHz]	4.757	5.161	5.822	5.701	5.899	3.801	4.258	3.233	2.489
Bending peculiar pitch (Radial direction) [kHz]	2.821	2.911	3.073	3.135	3.492	1.763	1.995	1.857	1.368
Bending peculiar pitch (Thrust direction) [kHz]	3.458	3.528	3.656	3.715	4.519	2.380	2.590	2.356	1.670
Twist angle at R.C. [°]	0.018	0.031	0.036	0.043	0.063	0.076	0.091	0.108	0.142
Accuracy safe bending load [N]	75	150	225	375	750	800	1000	1650	2750
Accuracy safe thrust load [N]	65	130	195	325	650	3750	12000	20000	22000



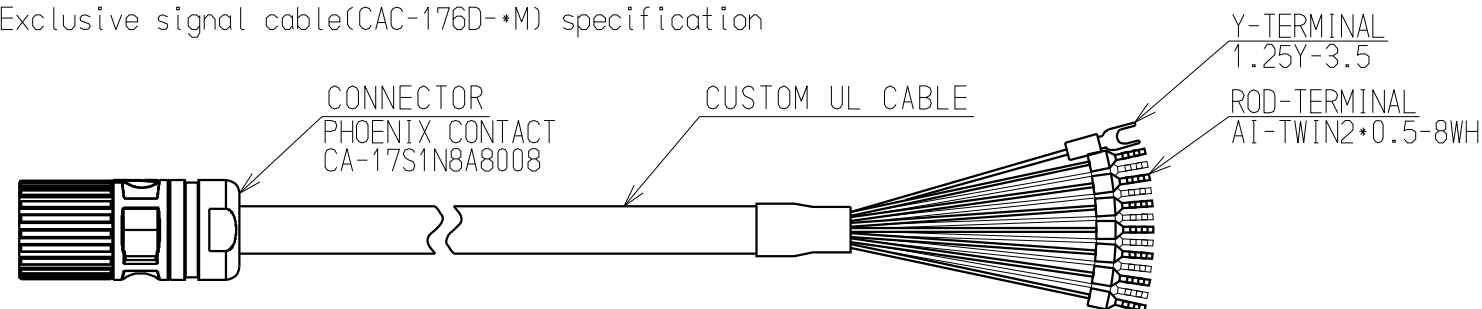
★ Accessories

- 1) Certificate
- 2) Instruction manual
- 3) Calibration software (Type:TMHSBD-01)
- 2) USB cable

- Accuracy safety bending/thrust load is load value(actual measurement) which generate output error 0.05%R.O.
- Accuracy safety bending load is the result of loading at position 200mm from flange edge.
- All are the guarantee value over static load.

【Information on optional items】

★ Exclusive signal cable(CAC-176D-*M) specification



★ Rotation detection mechanism

It is possible to install a rotation detection mechanism (RPM-*-*-*M) for TMHS, TMHSA.

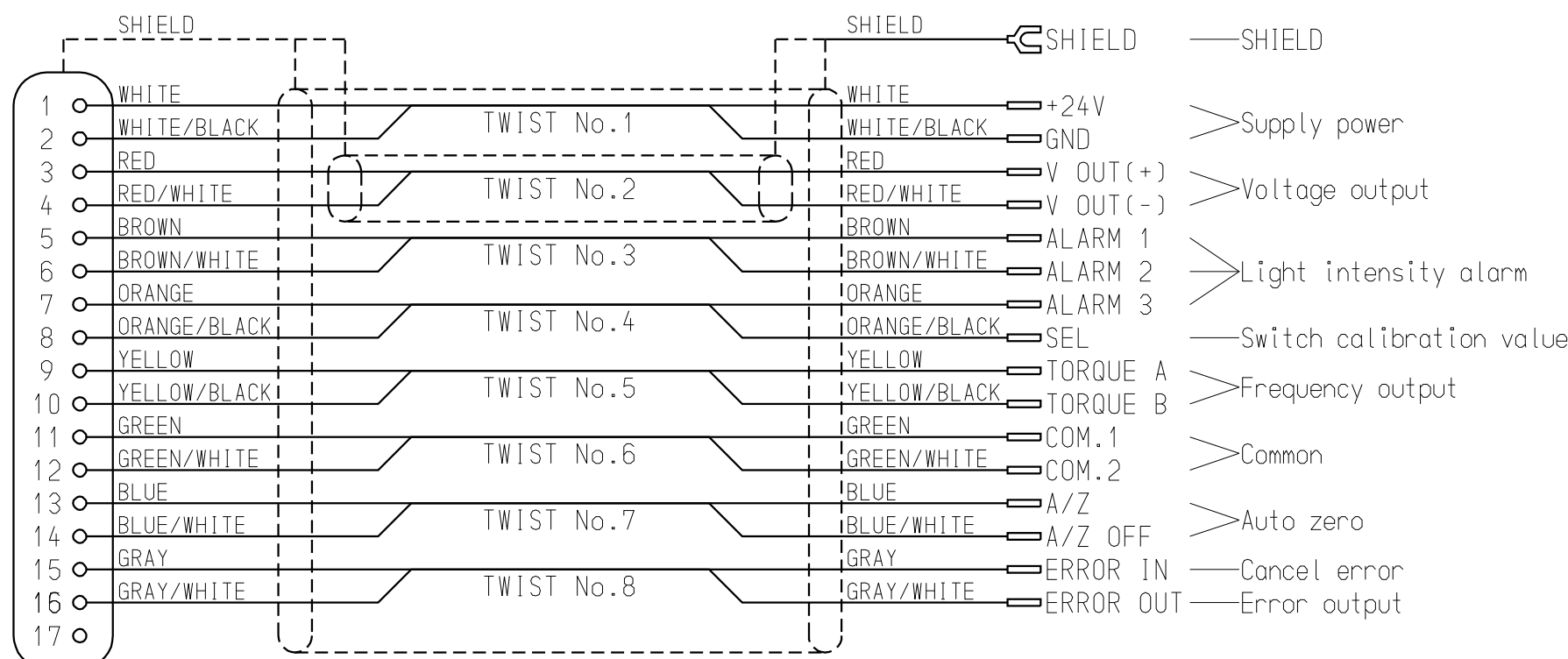
- Component part
- Detection gear
 - Mounting bolt
 - Detection sensor(MP-9820)
 - Sensor mounting bracket
 - Sensor cable
 - Mounting jig

- ※Power supply required for sensor.(DC12V)
- ※Only the rectangular wave(0-5V) is output from the sensor. It is necessary for you to convert to rotational speed.

Please refer to specifications of rotation detection mechanism.

【CONNECTOR SIDE PIN No.】

【TERMINAL SIDE】



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	品名 DESCRIPTION OUTLINE
	型式 MODEL NAME TMHSB
	図番 DRAWING NO. KT54835-2
	葉番 SHEET 2 / 9
	改訂 REV. D

★ Supply power specification

Rated supply voltage [V]	22~26
Consumption current [A]	1 or less
Rated power consumption [W]	24 or less

★ Output signal specification

Resistive load [kΩ]	2 or more
Output capacity load [μF]	0.1 or less

★ Voltage output correction function specification [△]

By connecting the PC and stator with special software, the following corrections are possible.

Zero adjustment [%R.O.]	About ±10
Symmetry correction[%R.O.]	±10
Switch calibration data	Two calibration data are held and switchable The items to switch are as follows • Calibration data • Symmetry correct data • Decimal point position • Maximum display of voltage output
Moving average [times]	1,2,4,8,16,32,64,128,256,512,1024,2048,4096 Select from above (Initial:1)
Low pass filter [Hz]	1,10,30,50,100,300,500,1k,6k Select from above (Initial:6k) -3dB±1dB(-3dB±3dB only at 1Hz) [△]
Invert the output polarity with respect to the twist direction	

[△]Low pass filter setting and output group delay time

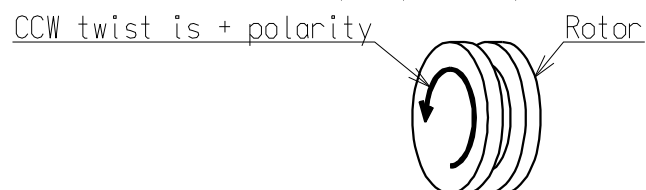
Low pass filter [Hz]	1	10	30	50	100	300	500	1k	6k
Group delay time [ms]	328	50	14	11	5.8	1.7	0.99	0.56	0.27

[△]When calibrating with a low torque value rated, calibration accuracy can be maintained up to 1/2 of the original capacity. Temperature effect and noise are proportional multiples.

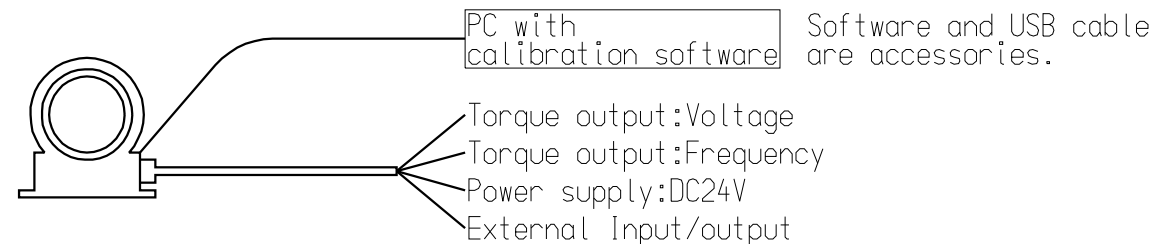
【Example : TMHSB-2KNM case】

Calibration status	Accuracy	Temperature effect on zero	Noise
Calibrated 2kNm as F.S.	0.03%F.S.=0.6[Nm]	0.02%F.S.=0.4[Nm/10℃]	0.5%F.S.=10[Nm]
Calibrated 1kNm as F.S.	0.03%F.S.=0.3[Nm]	0.04%F.S.=0.4[Nm/10℃]	1.0%F.S.=10[Nm]
Calibrated 500Nm as F.S.	0.06%F.S.=0.3[Nm]	0.08%F.S.=0.4[Nm/10℃]	2.0%F.S.=10[Nm]

【Torsion direction and output polarity under standard condition】



★ Input/output list



★ Error log function specification

Save 20 pieces of content and time when an error occurs in the table below. It is automatically deleted from the old one. You can check the contents by connecting the PC and the stator. Built-in battery so that the time does not stop even when not energized. Battery life is about 10 years.

• Torque overload
• Lack of light intensity
• Abnormal transmission data
• Rotor voltage drop
• Auto-zero abnormality

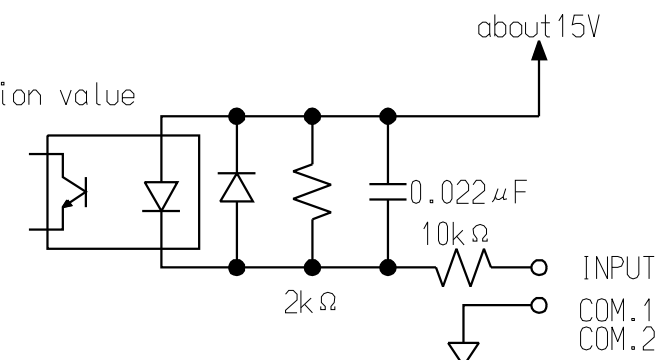
★ LED for status indication specification

Nonal operation state	Lit Green
Light intensity lower state	Blinking Green
Light intensity lack state	Lit Red
Error state	Blinking Red

Red blinking is retained even if the cause of the error is removed. The status display can be reset by releasing the error with an external signal or dedicated software.

★ External control input signal

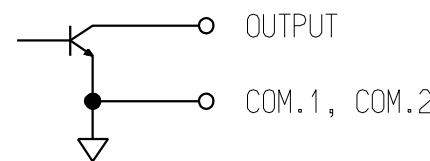
- SEL : With level signal input, switch the calibration value
- A/Z ON : With pulse signal input, turn A/Z ON
- A/Z OFF : With pulse signal input, turn A/Z OFF
- ERROR IN : With pulse signal input, cancel the error



*The internal circuit is insulated by a photocoupler

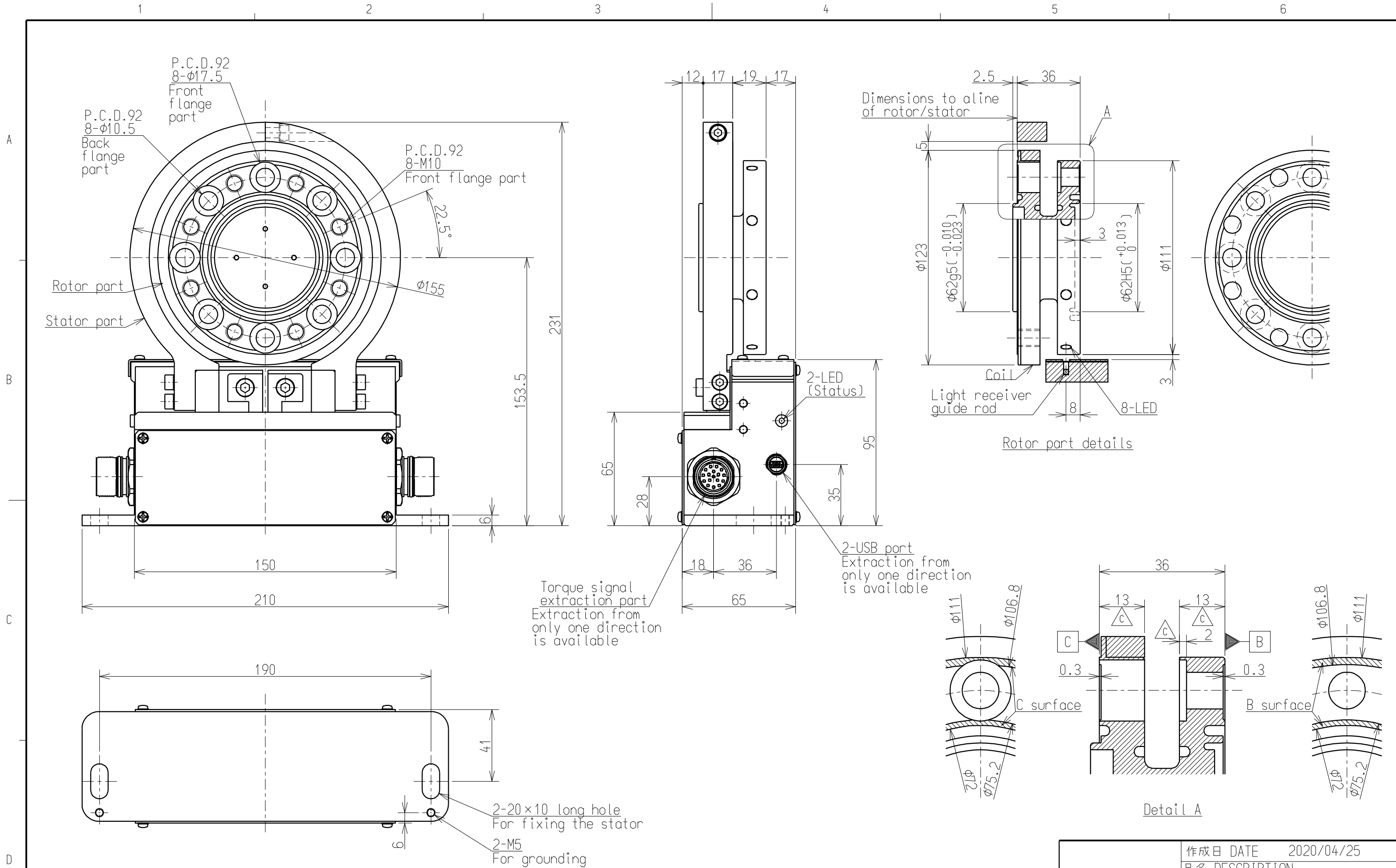
★ External control output signal

- ALARM1 : Always open collector ON
- ALARM2 : Open collector ON when the light intensity becomes low
- ALARM3 : Open collector ON when the light intensity becomes lack
- ERROR OUT : Open collector ON when an error occurs



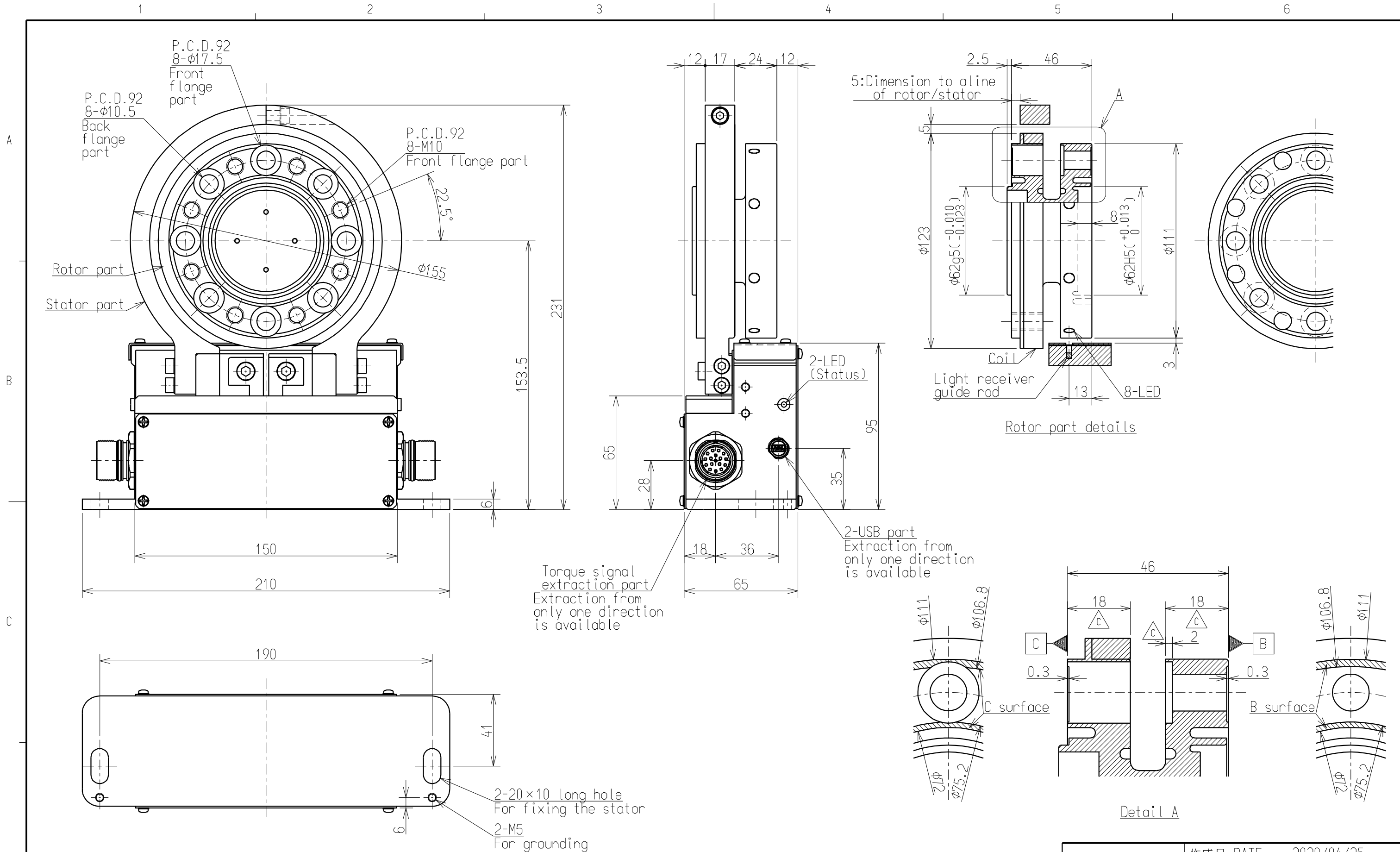
Open collector rating Vce=DC35Vmax, Ic=DC40mAmmax
*The internal circuit is insulated by a photocoupler

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センシングデバイス事業部 Sensing Device Business Unit	型式 MODEL NAME	TMHSB
	図番 DRAWING NO.	KT54835-2
	葉番 SHEET	3 / 9
	改訂 REV.	D



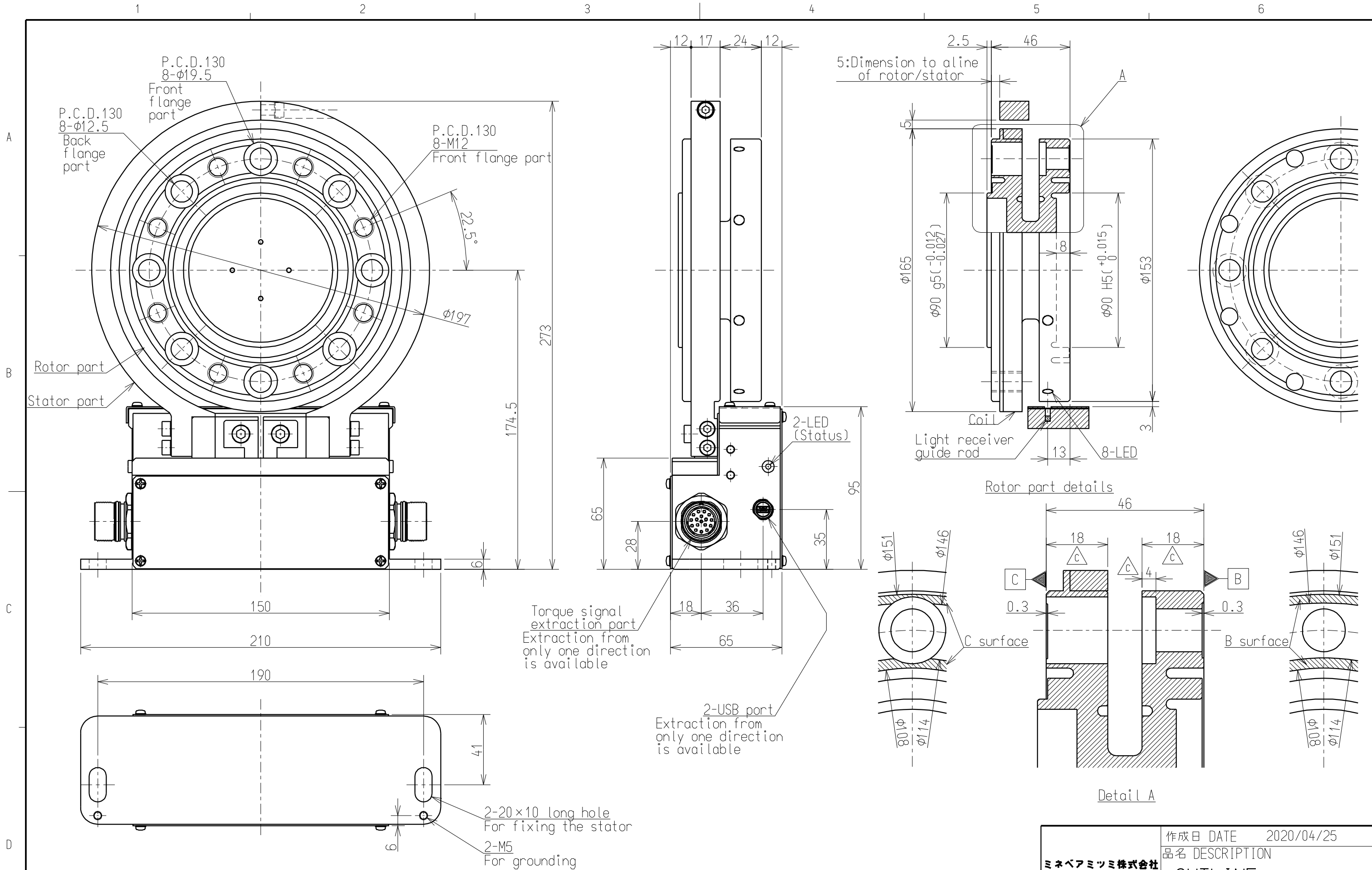
TMHSB-500NM

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	型式 MODEL NAME	TMHSB
	図番 DRAWING NO.	KT54835-2
	葉番 SHEET	5 / 9
	改訂 REV.	D



TMHSB-1KNM

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	型式 MODEL NAME	TMHSB
	図番 DRAWING NO.	KT54835-2
	葉番 SHEET	6 / 9
	改訂 REV.	D



TMHSB-2KNM, 3KNM

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	品名 DESCRIPTION	OUTLINE
	型式 MODEL NAME	TMHSB
	図番 DRAWING NO.	KT54835-2
	葉番 SHEET	7 / 9
	改訂 REV.	D

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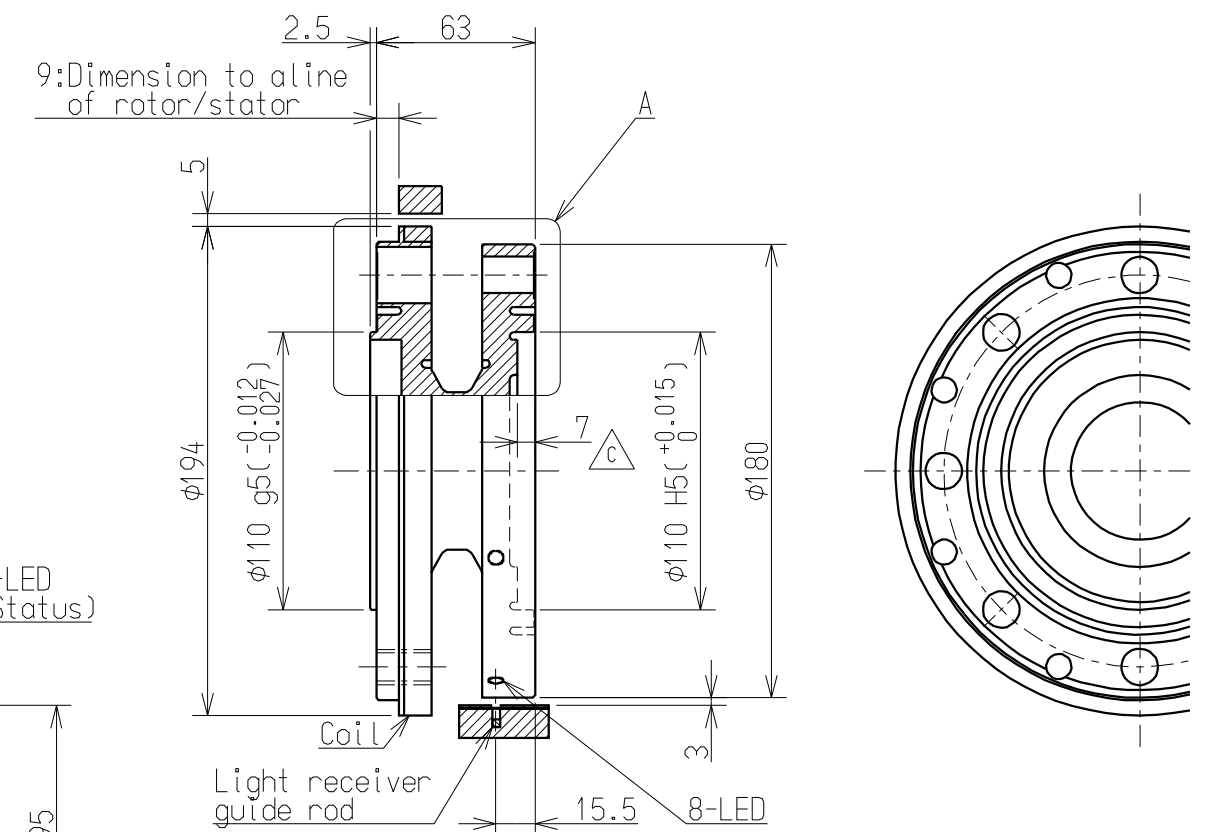
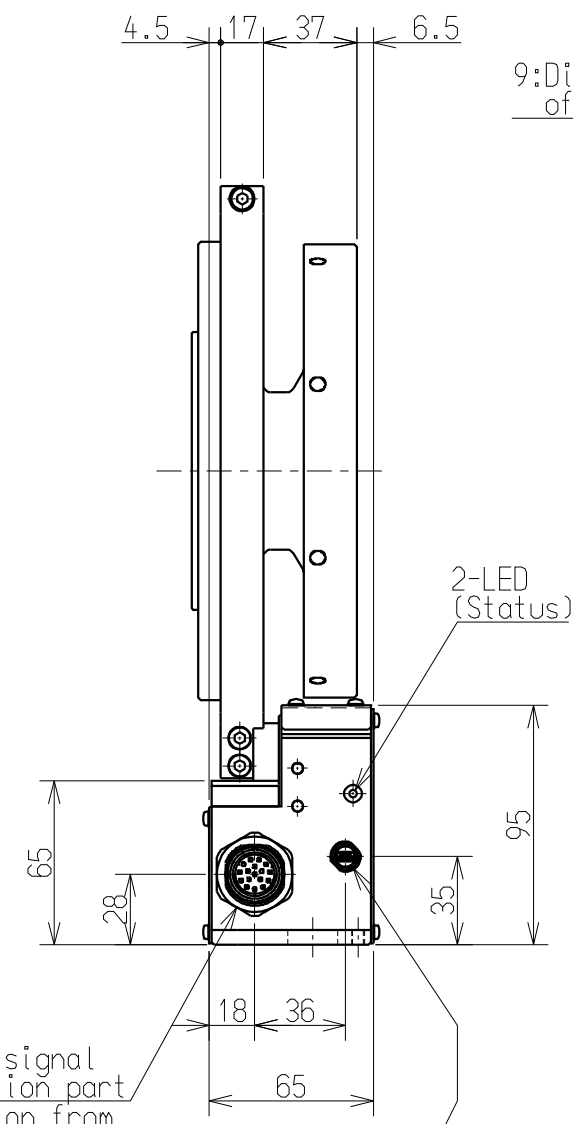
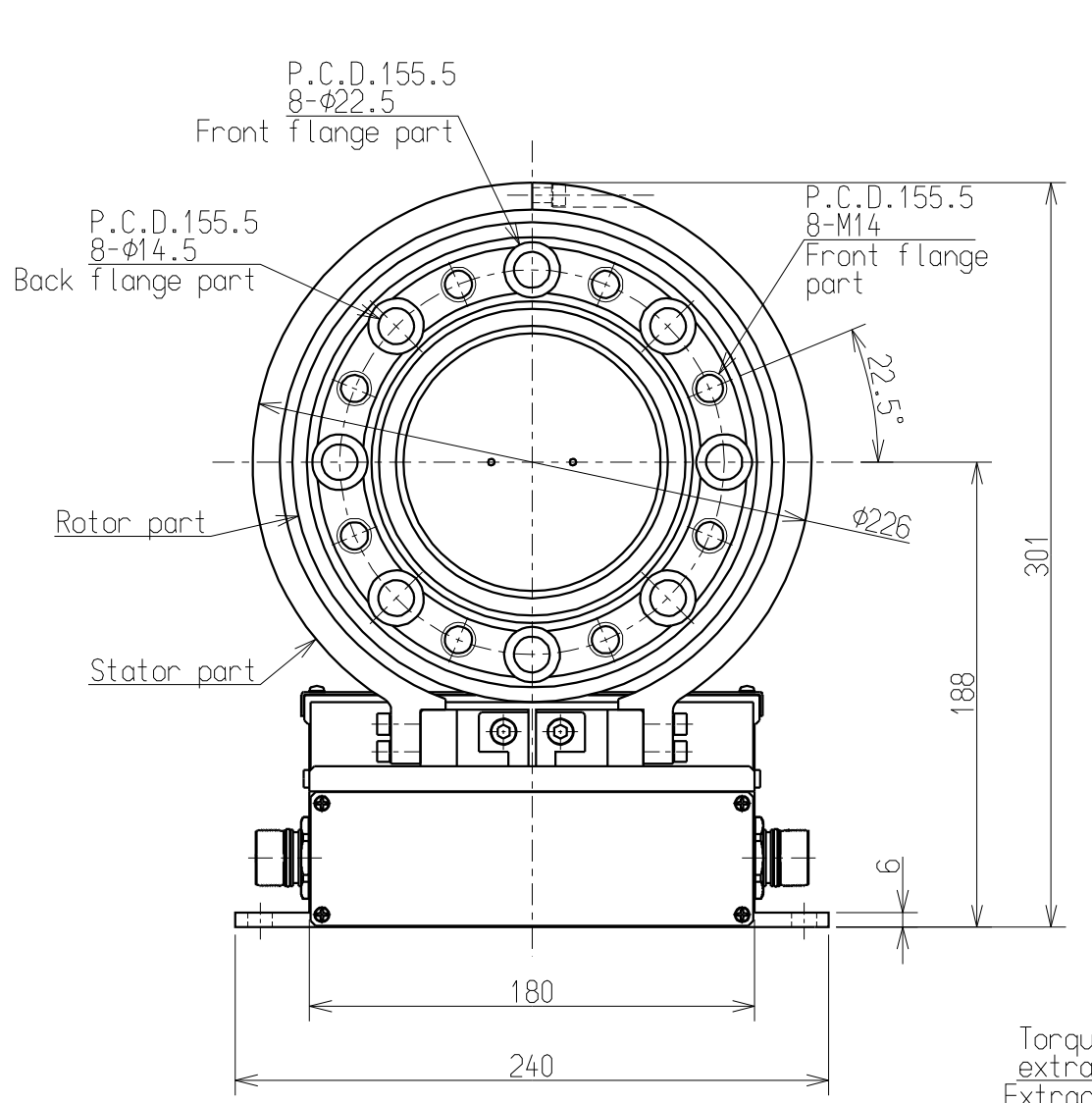
6

A

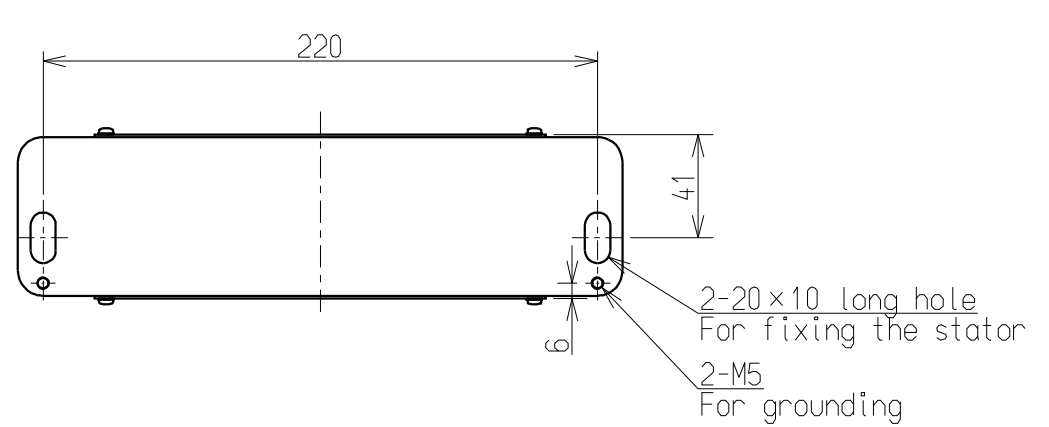
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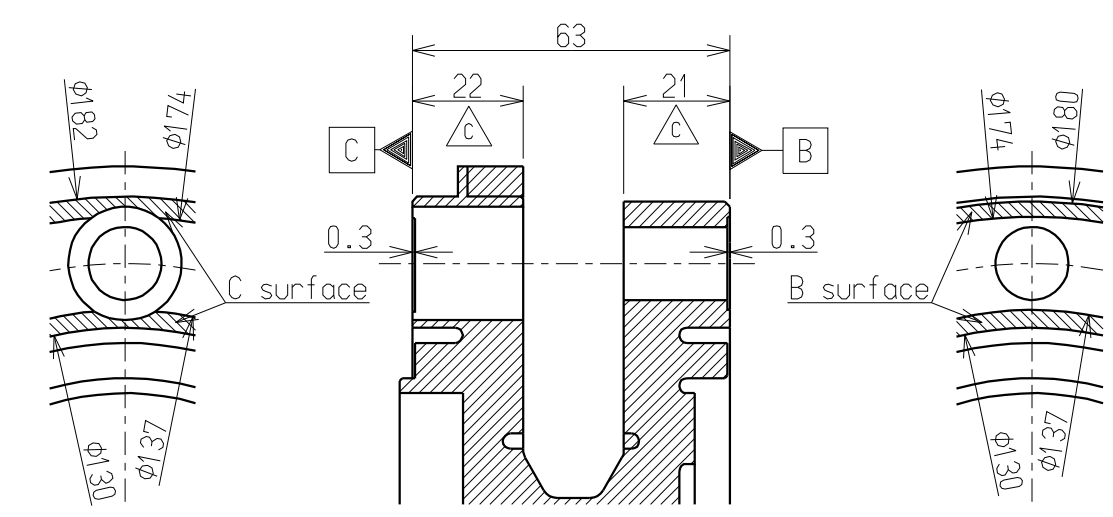
D



Rotor part details



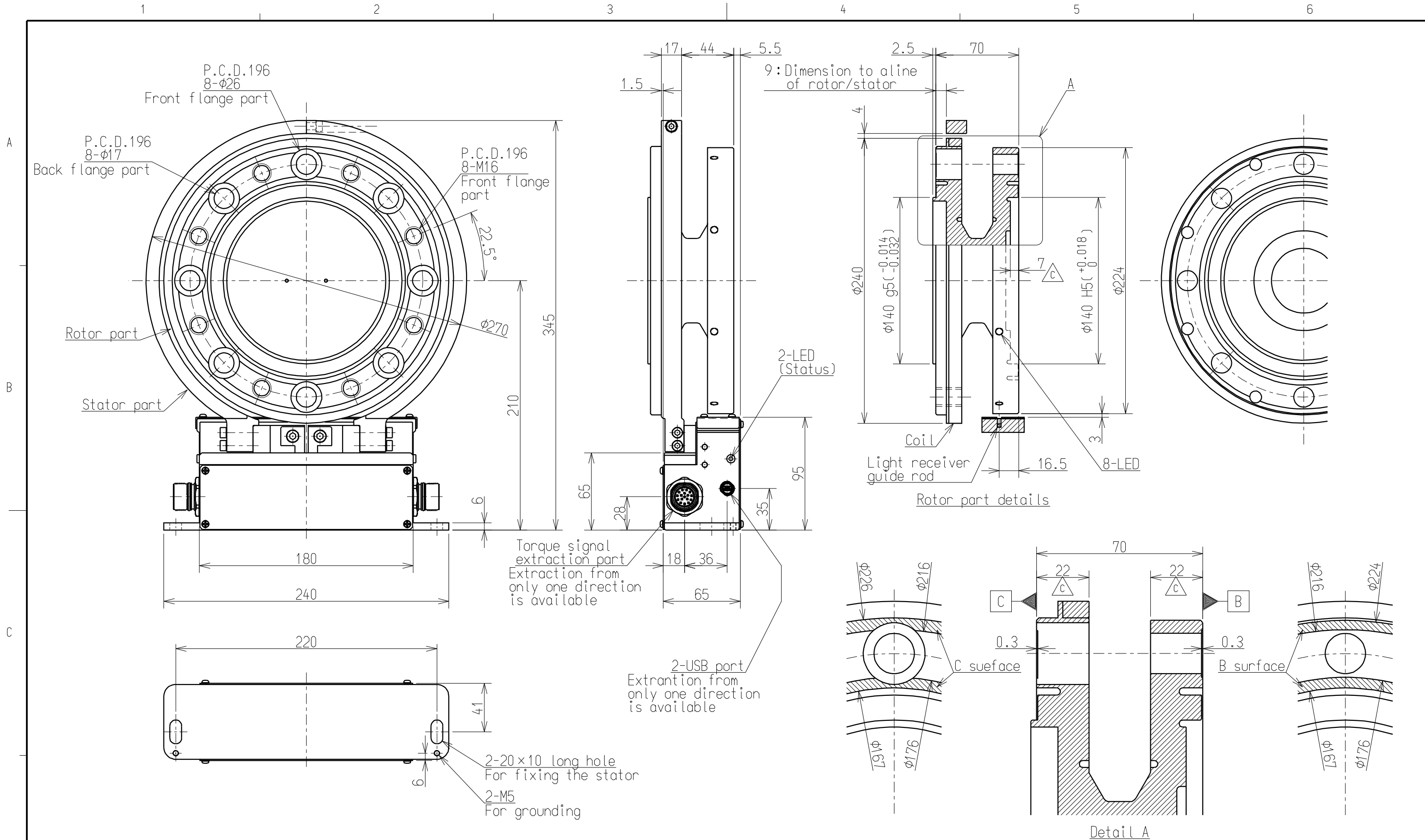
2-USB part
Extraction from only one direction is available



Detail A

TMHSB-5KNM

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	図番 DRAWING NO.	KT54835-2
	葉番 SHEET	8 / 9
	改訂 REV.	D



△ TMHSB-10KNM

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	型式 MODEL NAME	TMHSB
	図番 DRAWING NO.	KT54835-2
	葉番 SHEET	9 / 9
	改訂 REV.	D