CR5

ROTATING TORQUE METER

4502A

APPLICATIONS

- High precision measurement of torques for dynamic measures up to 1000 Nm.
- High precision.
- High speed.
- Built-in speed measurement.
- Torque measurements on drive motor.
- Versatility.

Version H

DESCRIPTION

The 4502A series torque transducer consists of a test body equipped with strain gauges and mounted in a free rotating housing with integrated connectors. A rotating collector ensures the transmission of the signal between the test body and the housing.

- Different geometries (type H, Q, R, RAU)
- Angle measurement (option A)
- Accuracy 0.2% EM
- Measurement ranges ±0.5 to ±1000Nm

ROTATING TORQUE METER

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BASIC TECHNICAL FEATURES

Measuring range	±0,5 …1000	N m
Rated torque M_{nom}	0,5 …1000	N m
Overload capacity		
Service torque	1.5 x M_{nom}	
Limiting torque	1.5 x M_{nom}	
Rotational angle/-speed measurement (Version QA, HA, RA, RAU)	2x360 TTL déphasés à 90°	Impulsion/revolut.
Nominal speed		
≤18 N m	12 000	
20…160 N m	9 000	
250… 1000 N m	7 000	
Version QA, HA, RA, RAU (rotational angle measurement)	7 000	tr/min
Housing material	Anodized aluminium	
Protection class	IP40	

TECHNICAL FEATURES

Cut-off fréquency -3 dB	3	kHz
Accuracy class	0.2	
Linearity error including hysteresis	<±0,2	% FSO
Output signal	±0…5	VDC
At rated torque (rated value)	5	VDC
Load resistance	>10	kΩ
Temp. influence on the zero point	<±0.015	% FSO/°C
Temp. Influence on the nominal value	<±0.015	% FSO/°C
Control signal	100±0,2	%
100% control input	'on' 5…30	VDC
	'off' 0…2	VDC
Operating temperature range	+10 to +60	°C
Service temperature range	0to 70	°C
Storage temperature range	-25 to +80	°C
Electrical connection	12 pin	Built-in connector
Supply voltage	11…26	VDC
Power consuption	<1	W

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ROTATING TORQUE METER

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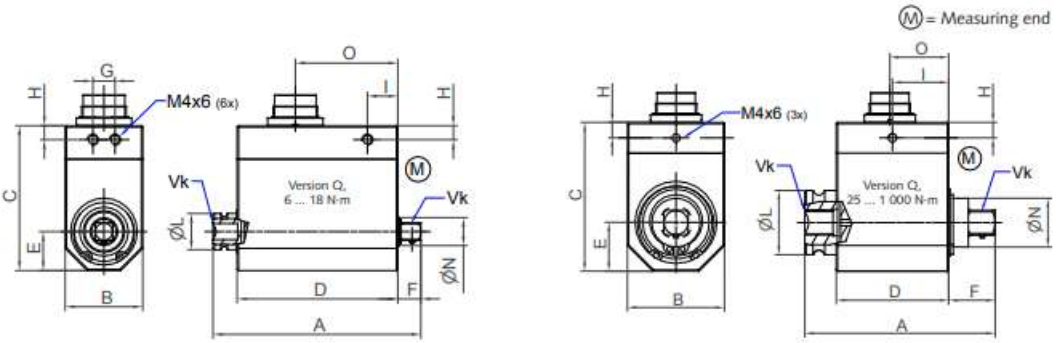
VERSION Q

- Torque sensor with standard square socket connection
- With rotating shaft
- Drive - inside square socket
- Output - external square socket



Type	Torsional rigidity N·m/rad	Angle of twist M_{nom} °	Inertia kgcm²		Weight kg
			Measuring end	Drive end	
4502A012Q	1 200	0,55	0,0121	0,0157	0,19
4502A018Q	1 200	0,85	0,0121	0,0157	0,19
4502A050Q	9 000	0,32	0,043	0,0843	0,28
4502A063Q	9 000	0,4	0,043	0,0843	0,28
4502A100Q	14 100	0,48	0,051	0,086	0,3
4502A150Q	14 100	0,61	0,051	0,086	0,3
4502A160Q	14 100	0,65	0,051	0,086	0,3
4502A250Q	71 650	0,21	0,465	0,758	0,92
4502A300Q	71 650	0,25	0,465	0,758	0,92
4502A500Q	71 650	0,4	0,465	0,758	0,92
4502A1k0Q	184 500	0,31	1,38	2,05	1,57

DIMENSIONS

Table Version Q

Threads for mounting: M4, 6 mm depth

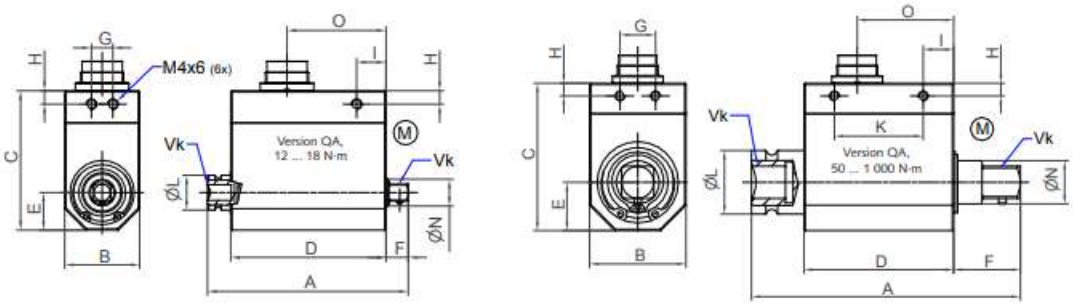
Type	Measuring range N·m	Square size	A	B	C	D	E	F	G	H	I	øL	øN	O	Axial force N max.	Radial force N max.
4502A012Q	12	1/4"	75	28	52	58	14	8,5	8	5	11	13	10	37	150	30
4502A018Q	18	1/4"	75	28	52	58	14	8,5	8	5	11	13	10	37	150	30
4502A050Q	50	3/8"	74,5	38	58	44	19	18	*	6	22	25	19	23	500	60
4502A063Q	63	3/8"	74,5	38	58	44	19	18	*	6	22	25	19	23	500	60
4502A100Q	100	1/2"	79	38	58	44	19	22,5	*	6	22	25	19	23	700	100
4502A150Q	150	1/2"	79	38	58	44	19	22,5	*	6	22	25	19	23	1 000	100
4502A160Q	160	1/2"	79	38	58	44	19	22,5	*	6	22	25	19	23	1 000	100
4502A250Q	250	3/4"	97	58	76	50	29	30	*	5	25	40	30	27	2 000	150
4502A300Q	300	3/4"	97	58	76	50	29	30	*	5	25	40	30	27	2 000	150
4502A500Q	500	3/4"	97	58	76	50	29	30	*	5	25	40	30	27	2 000	150
4502A1k0Q	1 000	1"	112	73	90	57	36,5	34,5	*	5	28,5	50	40	28,5	4 000	250

ROTATING TORQUE METER

4502A

VERSION QA

- Torque sensor with standard square socket connection
- With rotating shaft
- Drive - inside square socket
- Output - external square socket
- Rotational angle measurement



Type	Torsional rigidity N·m/rad	Angle of twist M_{nom} °	Inertia kgcm²		Weight kg
			Measuring end	Drive end	
4502A012QA	1 200	0,55	0,013	0,0157	0,2
4502A018QA	1 200	0,85	0,013	0,0157	0,2
4502A050QA	6 100	0,47	0,055	0,11	0,41
4502A063QA	6 100	0,59	0,055	0,11	0,41
4502A100QA	10 100	0,6	0,069	0,1	0,42
4502A150QA	10 100	0,85	0,069	0,1	0,42
4502A160QA	10 100	0,9	0,069	0,1	0,42
4502A250QA	63 600	0,23	0,68	1,0	1,24
4502A300QA	63 600	0,27	0,68	1,0	1,24
4502A500QA	63 600	0,45	0,68	1,0	1,24
4502A1k0QA	127 000	0,45	2,45	3,25	2,48

DIMENSIONS

Table Version QA (with rotational angle measurement)

Threads for mounting: M4, 6 mm depth

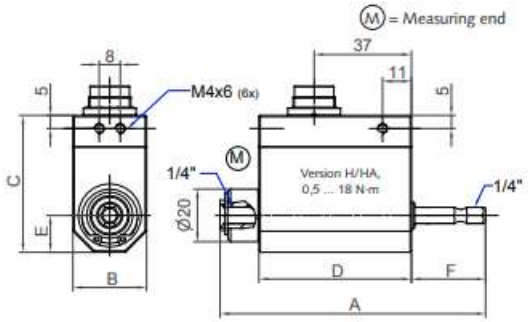
Type	Measuring range N·m	Square size Vk	A	B	C	D	E	F	G	H	I	K	øL	øN	O	Axial force N max.	Radial force N max.
4502A012QA	12	1/4"	75	28	52	58	14	8,5	8	5	11	–	13	10	37	150	30
4502A018QA	18	1/4"	75	28	52	58	14	8,5	8	5	11	–	13	10	37	150	30
4502A050QA	50	3/8"	101	38	58	59	19	21,5	14	5	12	35	25	17	38	500	60
4502A063QA	63	3/8"	101	38	58	59	19	21,5	14	5	12	35	25	17	38	500	60
4502A100QA	100	1/2"	106	38	58	59	19	26,5	14	5	12	35	25	17	38	700	100
4502A150QA	150	1/2"	106	38	58	59	19	26,5	14	5	12	35	25	17	38	1 000	100
4502A160QA	160	1/2"	106	38	58	59	19	26,5	14	5	12	35	25	17	38	1 000	100
4502A250QA	250	3/4"	135	58	76	64	29	40	30	5	14	36	40	30	40	2 000	150
4502A300QA	300	3/4"	135	58	76	64	29	40	30	5	14	36	40	30	40	2 000	150
4502A500QA	500	3/4"	135	58	76	64	29	40	30	5	14	36	40	30	40	2 000	150
4502A1k0QA	1 000	1"	177	73	90	73	36,5	57,5	45	5	14	45	50	40	44	4 000	250

ROTATING TORQUE METER

4502A

VERSION H or HA

- Torque sensor with standard 1/4" hex DIN3126 form E/F
- With rotating shaft
- Drive - hex shaft
- Output - hex socket
- Rotational angle measurement (Version HA)
- Quick action chuck



Type	Torsional rigidity N·m/rad	Angle of twist M_{nom} °	Inertia kgcm²		Weight kg
			Measuring end	Drive end	
4502A0,5H, ...HA	180	0,16	0,0134	0,0193	0,2
4502A001H, ...HA	180	0,32	0,0134	0,0193	0,2
4502A002H, ...HA	260	0,44	0,0135	0,0194	0,2
4502A006H, ...HA	505	0,68	0,0137	0,0216	0,21
4502A012H, ...HA	690	1,0	0,0140	0,0248	0,21
4502A018H, ...HA	690	1,5	0,0140	0,0248	0,21

DIMENSIONS

Table Version H or HA (with rotational angle measurement)

Threads for mounting: 6x M4, 6 mm depth

Type	Measuring range N·m	A	B	C	D	E	F	Axial force N max.	Radial force N max.
4502A0,5H, ...HA	0,5	101	28	52	58	14	28	20	5
4502A001H, ...HA	1	101	28	52	58	14	28	50	10
4502A002H ...HA	2	101	28	52	58	14	28	50	20
4502A006H, ...HA	6	101	28	52	58	14	28	150	40
4502A012H, ...HA	12	101	28	52	58	14	28	150	40
4502A018H, ...HA	18	101	28	52	58	14	28	200	40

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ROTATING TORQUE METER

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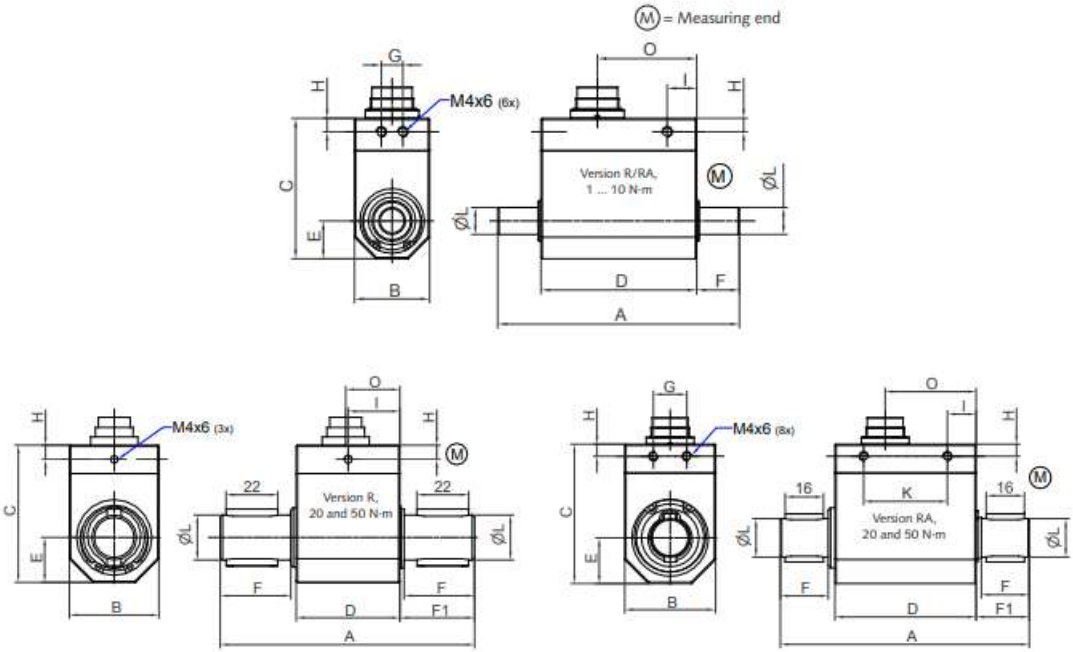
VERSION R or RA

- Torque sensor 1…50 n m with shaft end
- With rotating shaft
- Rotational angle measurement (version RA)



Type	Torsional rigidity N-m/rad	Angle of twist M_{max} °	Inertia kgcm²		Weight kg
			Measuring end	Drive end	
4502A001R, ...RA	317	0,17	0,0146	0,0147	0,15
4502A002R, ...RA	317	0,36	0,0146	0,0147	0,15
4502A005R, ...RA	855	0,34	0,015	0,015	0,16
4502A010R, ...RA	855	0,67	0,015	0,015	0,16
4502A020R	5 450	0,21	0,061	0,073	0,33
4502A050R	9 500	0,3	0,062	0,075	0,33
4502A020RA	5 450	0,21	0,9	1,02	0,4
4502A050RA	8 190	0,35	0,91	1,04	0,4

DIMENSIONS

Table Version R or RA (with rotational angle measurement)

Threads for mounting: M4, 6 mm depth

Type	Meas. range N-m	A	B	C	øL g6	F	F1	D	E	H	I	K	G	N	O	Axial force N max.	Radial force N max.
4502A001R, ...RA	1	90	28	52	10	15,9	17	58	14	5	11	–	8	shaft	37	20	5
4502A002R, ...RA	2	90	28	52	10	15,9	17	58	14	5	11	–	8	shaft	37	50	5
4502A005R, ...RA	5	90	28	52	10	15,9	17	58	14	5	11	–	8	shaft	37	50	10
4502A010R, ...RA	10	90	28	52	10	15,9	17	58	14	5	11	–	8	shaft	37	150	20
4502A020R	20	108	38	58	19	30	31,7	44	19	6	22	–	–	K**	23	150	50
4502A050R	50	108	38	58	19	30	31,7	44	19	6	22	–	–	K**	23	150	100
4502A020RA	20	104	38	58	16	20	23	59	19	5	12	35	14	K**	38	150	50
4502A050RA	50	104	38	58	16	20	23	59	19	5	12	35	14	K**	38	150	50

**With feather keyways (2x180 °) according to DIN6885

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ROTATING TORQUE METER

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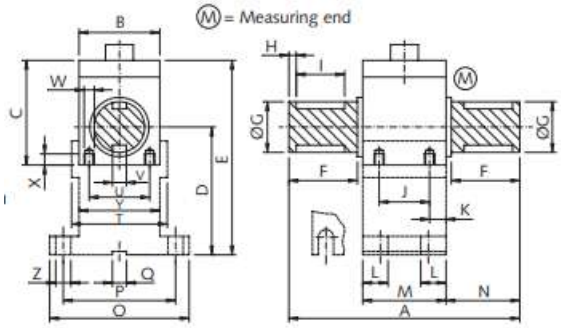
VERSION RA

- Torque sensor 100...1 0000 N m with shaft end and separate mounting base
- With rotating shaft
- Rotational angle measurement
- Shaft ends each with two keyways in accrodance with DIN6885



Type	Measuring range N·m	Torsional rigidity N·m/rad	Angle of twist M_{nom} °	Inertia kgcm²		Weight kg	Weight mounting base kg
				Measuring end	Drive end		
4502A100RA	100	28 600	0,2	0,665	0,605	1,13	1,06
4502A200RA	200	45 845	0,25	0,68	0,62	1,13	1,06
4502A500RA	500	130 000	0,22	3,2	2,63	2,84	1,23
4502A1k0RA	1 000	173 600	0,33	3,21	2,67	2,84	1,23

DIMENSIONS

Table Version RA (with rotational angle measurement)

Type	Measuring range N·m	A	B	C	D	E	F	øG g6	H	I	J	K	L	M	N	O	P
4502A100RA	100	125	58	76	112	159	27	28	2	22	39	12,5	20	64	30,5	120	100
4502A200RA	200	125	58	76	112	159	27	28	2	22	39	12,5	20	64	30,5	120	100
4502A500RA	500	197	73	90	112	165,5	58	42	3	50	37	18	25	73	62	120	100
4502A1k0RA	1 000	197	73	90	112	165,5	58	42	3	50	37	18	25	73	62	120	100

Option mounting base

Type	Measuring range N·m	Q P9	T	U	V P9	W	X	Y	Z	Axial force N max.	Radial force N max.
4502A100RA	100	10	68	43	8	M5 4x	8	–	10	300	200
4502A200RA	200	10	68	43	8	M5 4x	8	–	10	300	200
4502A500RA	500	10	83	52	14	M6 4x	10	73	10	300	300
4502A1k0RA	1 000	10	83	52	14	M6 4x	10	73	10	500	300

ROTATING TORQUE METER

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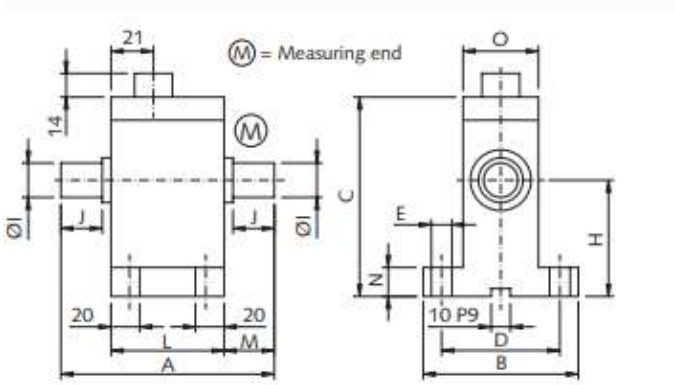
VERSION RAU

- Torque sensor with shaft end and integral mounting base
- This version can be used as functional check on tilt proce□dure or rotation monitoring
- Variable mounting positions, applications for left and right hand torque readings as well as the static and dynamic con□ditions are possible
- All RAU type sensors have an integrated rotational angle measurement



Type	Measuring range N·m	Torsional rigidity N·m/rad	Angle of twist M_{max} °	Inertia kgcm²		Weight kg
				Measuring end	Drive end	
4502A001RAU	1	317	0,17	0,0146	0,0147	0,38
4502A002RAU	2	317	0,36	0,0146	0,0147	0,38
4502A005RAU	5	855	0,34	0,015	0,015	0,38
4502A010RAU	10	855	0,67	0,015	0,015	0,38
4502A020RAU	20	4 580	0,25	0,062	0,061	0,78
4502A050RAU	50	8 190	0,35	0,064	0,063	0,78

DIMENSIONS

Table Version RAU (with rotational angle measurement)

Type	Measuring range N·m	A	B	C	D	E	H	øl g6	J	L	M	N	O	Size	Axial force N max.	Radial force N max.
4502A001RAU	1	90	58	83	45	7	45	10	15	58	16	12	28	1	20	10
4502A002RAU	2	90	58	83	45	7	45	10	15	58	16	12	28	1	50	10
4502A005RAU	5	90	58	83	45	7	45	10	15	58	16	12	28	1	100	20
4502A010RAU	10	90	58	83	45	7	45	10	15	58	16	12	28	1	100	30
4502A020RAU	20	106	85	102	60	9	63	17	22	59	23	15	38	2	150	100
4502A050RAU	50	106	85	102	60	9	63	17	22	59	23	15	38	2	150	100

ROTATING TORQUE METER

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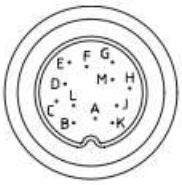
ELECTRICAL CONNECTIONS

Pin Allocation of the 12 Pin Built-in Connector



Function	PIN		Description
Supply	F	$+U_s$	11 ... 26 VDC, power consumption <1 W
	E	GND	Ground relating to U_s and angle of rotation pulses
Shield	M		In sensor connected to housing
Torque output	C	U_A	±5 VDC at M_{nom} at >2 kΩ 5 VDC at control signal activation R_{CE} = 10 Ω, output short circuit proof relating to AGND
	D	AGND	Ground relating to U_A
Angle of rotation sensor Supply	H	$+U_s$	5 VDC
Angle of rotation pulses	B	Track A	Open collector output Internal 1 kΩ resistance to 5 VDC (pull up), TTL-level
	G	Track B	As Track A, 90 ° displaced
100 % control input	K	Control	Off: 0 ... 2 VDC On: 5 ... 30 VDC
	A	KGND	Ground relating to control input
	J		Not connected

ACCESSORIES

Included Accessories

- None

Optional Accessories	Type	Mat.-No.
Mounting base, for Version RA ranges 100 ... 200 N·m	KSM020014	18008587
Mounting base, for Version RA ranges 500 ... 1 000 N·m	KSM020015	18008588
Female connector with solder eye 12 pin	KSM000703	18008371
Connection cable, 5 m, 12 pin – open ends	KSM124970-5	18008943
Connection cable, 2,5 m, 12 pin – CoMo Torque	KSM185380-2,5	18008963

ROTATING TORQUE METER

4502A

ORDER CODE

Ordering Key

Type 4502A □□

Measuring Ranges in N·m/
Possible Versions

0,5	–	–	H	HA	–	–	–		**0,5**
1	–	–	H	HA	R	RA	RAU		**001**
2	–	–	H	HA	R	RA	RAU		**002**
5	–	–	–	–	R	RA	RAU		**005**
6	–	–	H	HA	–	–	–		**006**
10	–	–	–	–	R	RA	RAU		**010**
12	Q	QA	H	HA	–	–	–		**012**
18	Q	QA	H	HA	–	–	–		**018**
20	–	–	–	–	R	RA	RAU		**020**
50	Q	QA	–	–	R	RA	RAU		**050**
63	Q	QA	–	–	–	–	–		**063**
100	Q	QA	–	–	–	RA	–		**100**
150	Q	QA	–	–	–	–	–		**150**
160	Q	QA	–	–	–	–	–		**160**
200	–	–	–	–	–	RA	–		**200**
250	Q	QA	–	–	–	–	–		**250**
300	Q	QA	–	–	–	–	–		**300**
500	Q	QA	–	–	–	RA	–		**500**
1 000	Q	QA	–	–	–	RA	–		**1k0**

Versions
(Note Dependence with Measuring Range)

Square socket	**Q**
Square socket with rotational angle meas.	**QA**
1/4" hex socket	**H**
1/4" hex socket with rotational angle meas.	**HA**
Rotating shaft	**R**
Rotating shaft with rotational angle meas.	**RA**
Rotating shaft with rotational angle meas. and integral mounting base	**RAU**

SPHEREL Systems reserves the right to make any kind of design or functional modification at any moment without prior notice.