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Installation Instructions Platform

KERN KFP V20

Type TKFP-V20-A

Version 2.4

2023-09

GB

TKFP-V20-A-IA-e-2324



KERN KFP V20

Platform

Version 2.4 2023-09

Installation Instructions

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1 General hints

These installation instructions contain all data necessary for placing and commissioning the following platforms:

KERN TKFP 3V20M-A

KERN TKFP 6V20M-A, TKFP 6V20LM-A

KERN TKFP 15V20M-A, TKFP 15V20LM-A

KERN TKFP 30V20M-A, TKFP 30V20LM-A

KERN TKFP 60V20M-A, TKFP 60V20LM-A

KERN TKFP 150V20M-A, TKFP 150V20LM-A

KERN TKFP 300V20M-A

KERN TKFP 600V20M-A

2 Technical data

Item no./ Type	Weighting range Max kg	Readability g	Verification value g	Minimum load Min g	Cable length approx. m	Transport Securing
TKFP 3V20M-A	3	0,1	1	20	3,0	yes
TKFP 6V20M-A	6	0,2	1; 2	20; 40	3,0	yes
TKFP 6V20LM-A	6	0,2	1; 2	20; 40	3,0	yes
TKFP 15V20M-A	6; 15	0,5	2; 5	40; 100	3,0	yes
TKFP 15V20LM-A	6; 15	0,5	2; 5	40; 100	3,0	yes
TKFP 30V20M-A	15; 30	1	5; 10	100; 200	3,0	yes
TKFP 30V20LM-A	15; 30	1	5; 10	100; 200	3,0	yes
TKFP 60V20M-A	30; 60	2	10; 20	200; 400	3,0	no
TKFP 60V20LM-A	30; 60	2	10; 20	200; 400	3,0	no
TKFP 150V20M-A	60; 150	5	20; 50	400; 1000	3,0	no
TKFP 150V20LM-A	60; 150	5	20; 50	400; 1000	3,0	no
TKFP 300V20M-A	150; 300	10	50; 100	1000; 2000	3,0	no
TKFP 600V20M-A	600	20	200	4000	2,5	no

2.1 Technical data of the weighing cell

Sensitivity		2 mV/V
Input resistance (all TKFP models*)		409 Ω
*excepted	TKFP 60V20M-A	406 Ω
*excepted	TKFP 600V20M-A	400 Ω
Output resistance (all TKFP models)		350 Ω
*excepted	TKFP 600V20M-A	400 Ω
Power supply (all TKFP models*)		5 – 12 V AC/DC
*excepted	TKFP 15V20LM-A	5 – 12 V DC
*excepted	TKFP 600V20M-A	5 V AC/DC
Accuracy class		C

3 Basic Information (General)

3.1 Documentation

These installation instructions contain all data necessary for placing and commissioning the platform KERN TKFP V20-A.

In combination with a display unit, described below as weighing system, for operation configuration, please refer to the operating instructions of the display unit.

3.2 Proper use

The platform purchased by you is intended to define the weighing value of weighed goods. It is intended to be used as a “non-automatic balance”, i.e. the material to be weighed is manually and carefully placed in the centre of the weighing pan. As soon as a stable weighing value is reached, the weighing value can be read.

3.3 Improper Use

- Our balances are non-automatic balances, not provided for the use in dynamic weighing processes. However, the balances can also be used for dynamic weighing processes after verifying their individual operative range, and here especially the accuracy requirements of the application.
- Do not leave permanent load on the weighing pan. This can damage the measuring mechanism.
- Impacts and overloading exceeding the stated maximum load (max) of the weighing system, minus a possibly existing tare load, must be strictly avoided. The weighing system could be damaged.
- Never operate the weighing system in explosive environment. The serial version is not explosion protected.
- Changes to the weighing system's design are not permitted. This may lead to incorrect weighing results, safety-related faults and destruction of the balance.
- The weighing system unit may only be operated in accordance with the described default settings. Other areas of use must be released by KERN in writing.

3.4 Warranty

Warranty claims shall be voided in case:

- Our conditions in the operation manual are ignored
- The appliance is used beyond the described intended use
- Structural changes of the device
- Mechanical damage and damage caused by media, liquids
- Natural wear and tear
- The appliance is improperly set up or incorrectly electrically connected
- Overload of the measuring system

3.5 Monitoring of Test Resources

In the framework of quality assurance the measuring-related properties of the weighing system and, if applicable, the testing weight, must be checked regularly. The responsible user must define a suitable interval as well as type and scope of this test.

Information is available on KERN's home page (www.kern-sohn.com) with regard to the monitoring of weighing system test substances and the test weights required for this. In KERN's accredited DKD calibration laboratory test weights and weighing systems may be calibrated (return to the national standard) fast and at moderate cost.

4 Basic Safety Precautions

4.1 Pay attention to the instructions in the Operation Manual



Carefully read this operation manual before setup and commissioning, even if you are already familiar with KERN balances.

4.2 Personnel training

The appliance may only be operated and maintained by trained staff. The installation and maintenance must only be carried out by a well acquainted specialist with the workings of weighing balances.

5 Transport and storage

5.1 Testing upon acceptance

When receiving the appliance, please check packaging immediately, and the appliance itself when unpacking for possible visible damage.

5.2 Packaging / return transport



- ⇒ Keep all parts of the original packaging for a possibly required return.
 - ⇒ Only use original packaging for returning.
 - ⇒ Prior to dispatch disconnect all cables and remove loose/mobile parts.
 - ⇒ Reattach possibly supplied transport securing devices.
 - ⇒ Secure all parts against shifting and damage.
-

6 Unpacking, Installation and Commissioning

6.1 Installation Site, Location of Use

The platforms are designed in a way that reliable weighing results are achieved in common conditions of use.

You will work accurately and fast if you select the right location for your weighing system.

On the installation site observe the following:

- Place the weighing system on a firm, level surface. The floor must be able to carry safely the weight of the maximally loaded platform at the resting points. At the same time it should be sufficiently stable, that no vibrations may occur during weighing work. This is to be considered too when the platform is installed in conveyor systems and similar.
- In the installation site possibly no vibrations, e.g. by neighbouring machines should occur.
- Do not use the weighing system in an explosive environment.
- Avoid extreme heat as well as temperature fluctuation e.g. caused by installing next to a radiator or in the direct sunlight.
- Protect the weighing system against direct draughts e.g. due to open windows and doors.
- Use weighing system only in dry environment, protect it against high humidity, vapours and dust.
- The platform must have been stabilized to room temperature, before power supply is switched on.
- Do not expose the appliance to heavy moisture over a longer time period. Non-permitted condensation (condensation of air humidity on the appliance) may occur if a cold appliance is taken to a considerably warmer environment. In this case, acclimatize the disconnected appliance for ca. 2 hours at room temperature.
- Avoid jarring during weighing.
- Avoid static charge of weighed goods and weighing container.
- Keep away chemicals (such as liquids or gasses), which could attack and damage the balance inside or from outside.
- Keep IP protection of the device.
- If electromagnetic fields (e.g. by mobile phones or radio equipment), static charges (e.g. when weighing or countings plastic parts), as well as instable current supply occur, the displayed indications may differ considerably (wrong weighing results, damage to the balance). Change location or remove source of interference.

6.2 Unpacking, Scope of delivery

Remove the underconstruction and the weighing plate from the package, remove packaging material and place the devices at the planned workplace. Check if all parts of the scope of delivery are present and free of damage.

Scope of delivery:

- Underconstruction (lacquered steel)
- Weighing pan (stainless steel)
- Transport securing (depending on model, see chap. 2)
- Installation Instructions

6.3 Placing

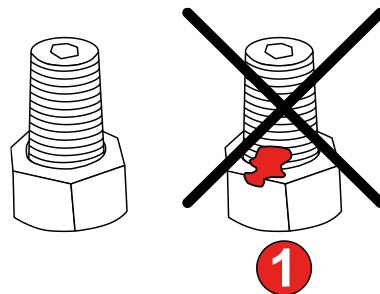
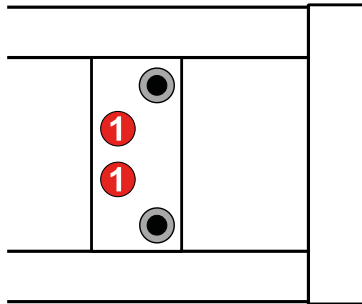
1. Remove transport securing (see chap. 6.3.1).
2. Put the weighing plate on the underconstruction.

6.3.1 Transport Securing

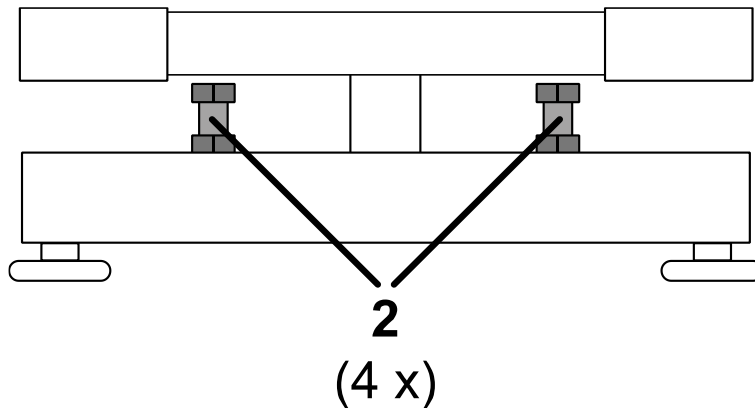


General hints for transport securing

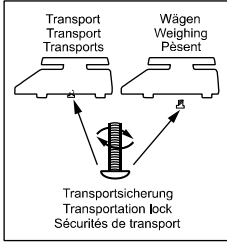
- Please consult the Technical Data whether your balance is equipped with a transport securing, chap. 2.
- There are different types of transport securings in KERN balances. Please see the indications explained in this chapter.
- Never remove other screws than these for the transport securing as otherwise the balance could be damaged.
- The sealed screws **(1)** must not be unscrewed. The sealed screws can be recognized by the sealing varnish (different colours).



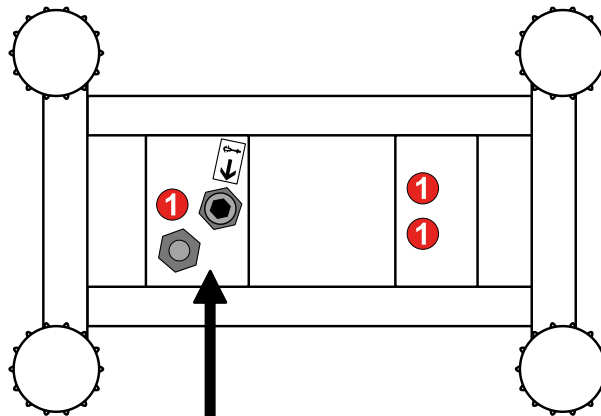
- Do not remove the off-centre load attachments **(2)** as otherwise the balance could be damaged. The off-centre load attachments are located between the upper and the lower part of the platform. They consist of a screw and a nut.



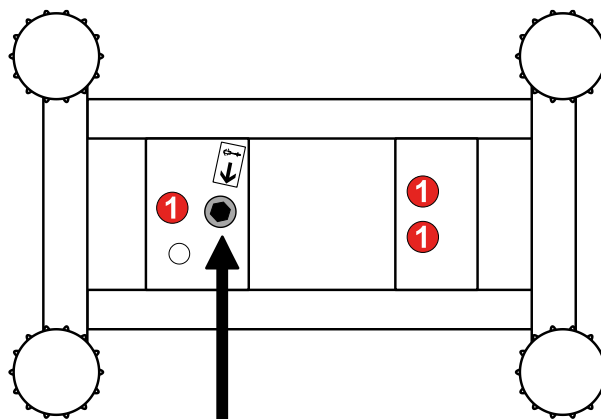
Variant 1:

Note on transport securing	
Type of transport securing	• 1 x hexagon screw on the upper side with nut • 1 x threaded pin with inner hexagon on the lower side with nut

1. Remove the weighing plate.
2. Turn the scale over so that the bottom is facing you.
3. The position of the transport securings is marked by an arrow.
4. Remove the nuts of the transport securings on the lower side.

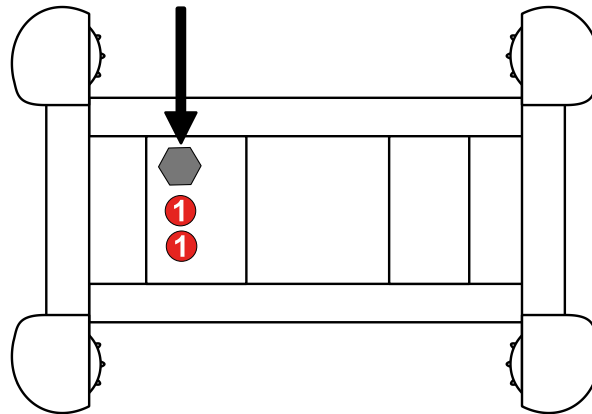


5. Remove the threaded pin on the lower side.



6. Turn the balance over so that the top is facing you.

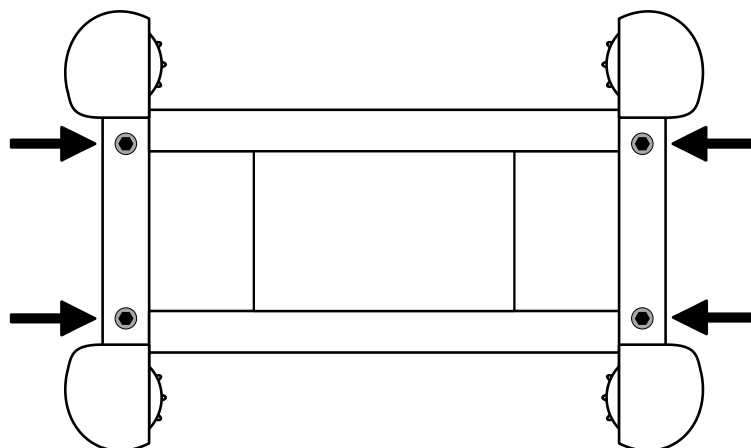
7. Remove the hexagon screw on the upper side.



Variant 2:

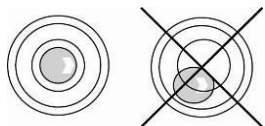
Note on transport securing	
Type of transport securing	4 x cylinder head screw with inner hexagon on the upper side

1. Remove the weighing plate.
2. Remove the transport securings.



6.4 Levelling

Accurate weighing results require a platform with perfect horizontal alignment. During initial installation and after each change of work area it is necessary to level the platform.



- ⇒ As the air bubble is located under the weighing plate, remove it.
- ⇒ Align the platform with the adjustment feet until the air bubble of the water balance is in the prescribed circle.

6.5 Connecting a display unit



Before any installation work, disconnect the appliance from the operating voltage.

Put the connecting cable to the display unit in a manner that it is protected against damage.

Connect the platform to the display unit according to the following table.

Output load cell	Connection of platform KERN KFP
EXC+ (5V)	see labelling of load cell
EXC- (0)	
SIG-	
SIG+	
SEN+	
SEN-	

7 Operation

Information about

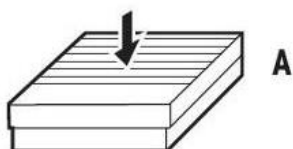
- **Mains connection**
(power is supplied via the connecting cable of the display unit)
- **Initial Commissioning**
- **Connection of peripheral appliances**
- **Adjustment, linearization and verification**
(only the complete balance is verifiable, i.e. platform in conjunction with a suitable display unit)

and the correct operation you will find in the operating instructions included in the scope of delivery of the display unit.

8 Operation limits

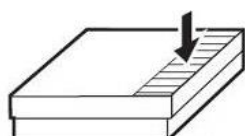
The platform is designed so robust that a casual excess of the maximum weighing load will not cause any damage.

The static carrying capacity, i.e. the maximum admitted load depends on the type of load carrier (Position A – C). The maximum static carrying capacity must not be exceeded.



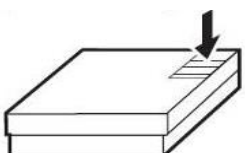
A

A = with central load



B

B = with side load



C

C = with one-side load



Avoid falling load, shock loads and impacts from the side!

Observe the following operation limits:

Item no./ Type	A	B	C
TKFP 3V20M-A	4 kg	3 kg	1 kg
TKFP 6V20M-A	9 kg	6 kg	3 kg
TKFP 6V20LM-A	9 kg	6 kg	3 kg
TKFP 15V20M-A	22 kg	15 kg	7 kg
TKFP 15V20LM-A	22 kg	15 kg	7 kg
TKFP 30V20M-A	45 kg	30 kg	15 kg
TKFP 30V20LM-A	45 kg	30 kg	15 kg
TKFP 60V20M-A	90 kg	60 kg	30 kg
TKFP 60V20LM-A	90 kg	60 kg	30 kg
TKFP 150V20M-A	225 kg	150 kg	75 kg
TKFP 150V20LM-A	225 kg	150 kg	75 kg
TKFP 300V20M-A	450 kg	300 kg	150 kg
TKFP 600V20M-A	900 kg	600 kg	300 kg

9 Servicing, maintenance, disposal



Before any maintenance, cleaning and repair work disconnect the appliance from the operating voltage.

9.1 Cleaning

- ⇒ Clean the platform with a soft cloth soaked with a mild cleaning agent.
- ⇒ Remove the weighing plate and wipe-off the dirt and the foreign bodies under it. Do not use hard or sharp objects for this.
- ⇒ Remove regularly corrosive substances.
- ⇒ Keep IP protection.

9.2 Servicing, maintenance

- ⇒ The appliance may only be opened by trained service technicians who are authorized by KERN.
- ⇒ Ensure that the weighing system is regularly calibrated, see chap. 3.5 Testing instruments monitoring.

9.3 Disposal

- ⇒ Disposal of packaging and appliance must be carried out by operator according to valid national or regional law of the location where the appliance is used.

10 Instant help for troubleshooting

In case of an error in the program process, briefly turn off the balance and disconnect from power supply. The weighing process must then be restarted from the beginning.

Help:

Fault

The displayed weight is permanently changing

Possible cause

- Draught/air movement
- Floor vibrations
- The platform has contact with foreign objects.
- Electromagnetic fields / static charging (choose different location/switch off interfering device if possible)

The weighing result is obviously wrong

- No zero display with unloaded balance
- Adjustment is no longer correct.
- Great fluctuations in temperature.
- Platform on an uneven surface.
- Electromagnetic fields / static charging (choose different location/switch off interfering device if possible)

Should other error messages occur, switch balance off and then on again. If the error message remains inform manufacturer.

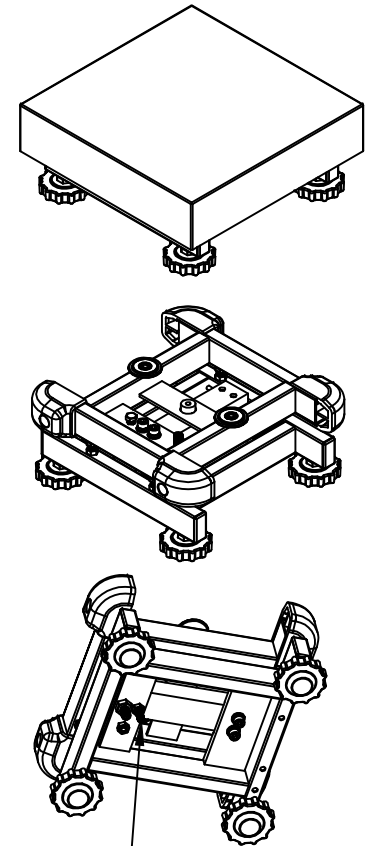
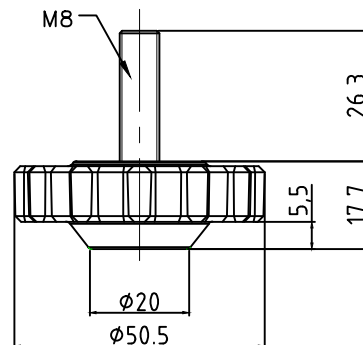
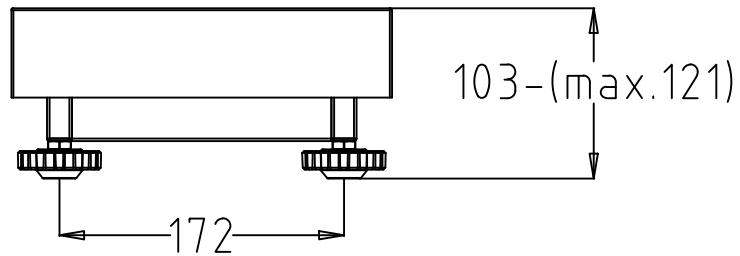
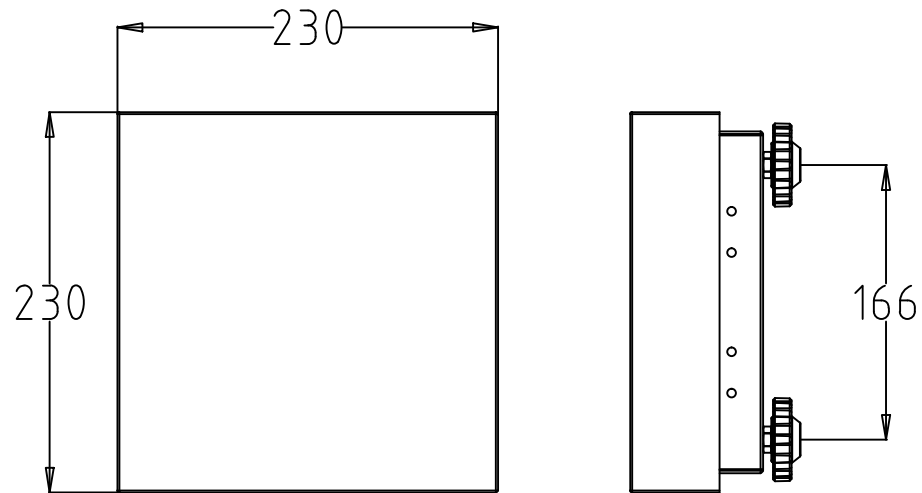
11 Preload, Deadload and Overload settings

Item no./ Type	Deadload** (kg) **= already applied preload	Centric overload protection (kg)	Off-centre overload protection (kg)	Minimum capacity of the load cell E _{min} (kg)	Maximum capacity of the load cell E _{max} (kg)
TKFP 3V20M-A	1,7	-	3,6	0	5
TKFP 6V20M-A	1,7	-	7,2	0	10
TKFP 6V20LM-A	2,6	-	7,2	0	10
TKFP 15V20M-A	2,6	-	18	0	20
TKFP 15V20LM-A	3,3	-	18	0	20
TKFP 30V20M-A	3,3	-	36	0	50
TKFP 30V20LM-A	4,9	-	36	0	50
TKFP 60V20M-A	3,3	-	72	0	100
TKFP 60V20LM-A	4,9	-	72	0	100
TKFP 150V20M-A	4,9	-	180	0	200
TKFP 150V20LM-A	10,1	-	180	0	200
TKFP 300V20M-A	10,1	-	360	0	500
TKFP 600V20M-A	26	-	660	0	750

Item no./ Type	Dimensions of the platform (mm)	Load cell type	Test certificate no.	Accuracy class	Ratio of min. load cell verification interval	Maximum admitted number of interval sizes	Allowable temperature range		Ratio of min. dead load output return	Error percentage
					Y	n_{LC}/n_{max}	T_{min}	T_{max}	Z	PLC
							(°C)	(°C)		
TKFP 3V20M-A	230 x 230 x 103	L6D 5KG	TC7868 rev. 1	C	10000	3000	-10	40	3000	0,7
TKFP 6V20M-A	230 x 230 x 103	L6D 10KG	TC7868 rev. 1	C	10000	3000	-10	40	3000	0,7
TKFP 6V20LM-A	300 x 240 x 106	L6D 10KG	TC7868 rev. 1	C	10000	3000	-10	40	3000	0,7
TKFP 15V20M-A	300 x 240 x 106	L6D 20KG	TC7868 rev. 1	C	10000	3000	-10	40	3000	0,7
TKFP 15V20LM-A	400 x 300 x 114	L6N 20KG	D09-06.11 rev. 1	C	12000	3000	-10	40	4000	0,7
TKFP 30V20M-A	400 x 300 x 114	L6E 50KG	TC7838 rev. 1	C	10000	3000	-10	40	4200	0,7
TKFP 30V20LM-A	500 x 400 x 125	L6G 50KG	D09-03.22 rev. 2	C	10000	3000	-10	40	3000	0,7
TKFP 60V20M-A	400 x 300 x 114	L6E 100KG	TC7838 rev. 1	C	10000	3000	-10	40	4200	0,7
TKFP 60V20LM-A	500 x 400 x 124	L6G 100KG	D09-03.22 rev. 2	C	12000	3000	-10	40	3000	0,7
TKFP 150V20M-A	500 x 400 x 124	L6G 200KG	D09-03.22 rev. 2	C	12000	3000	-10	40	3000	0,7
TKFP 150V20LM-A	650 x 500 x 136	L6G 200KG	D09-03.22 rev. 2	C	12000	3000	-10	40	3000	0,7
TKFP 300V20M-A	650 x 500 x 136	L6G 500KG	D09-03.22 rev. 2	C	12000	3000	-10	40	3000	0,7
TKFP 600V20M-A	800 x 600 x 190	PW12C 750KG	TC11749 rev. 0	C	25000	6000	-10	40	8000	0,7

12 Enclosure

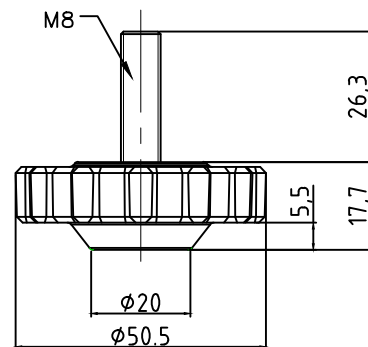
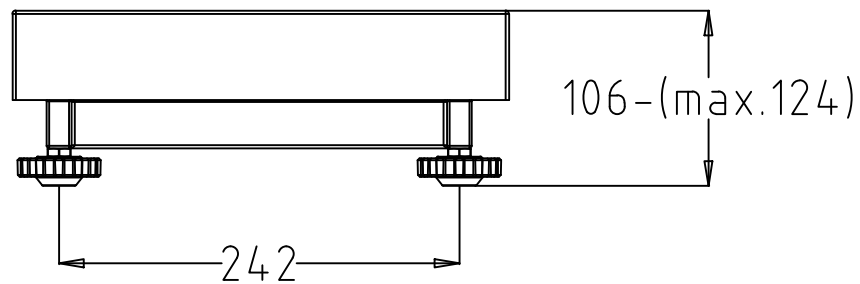
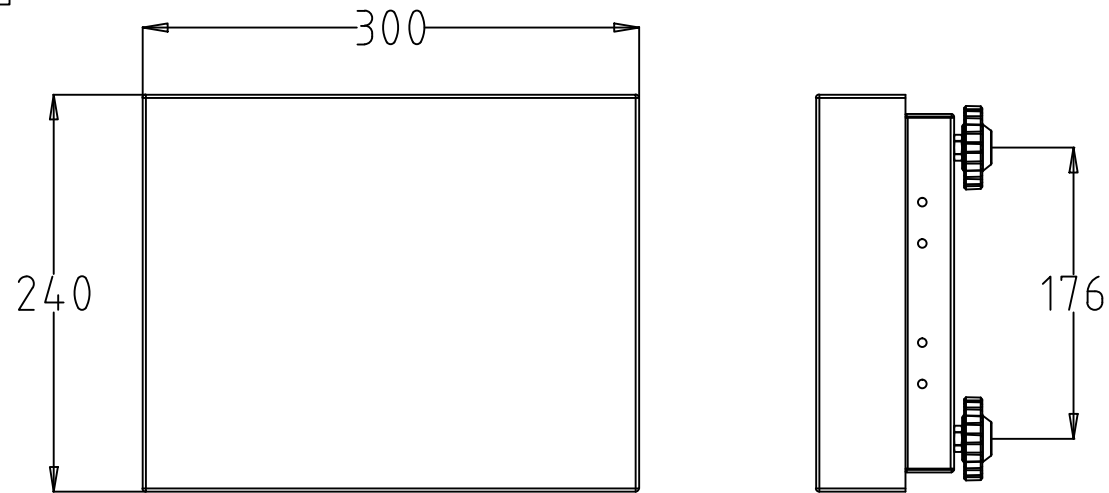
A4



Transport protection screw

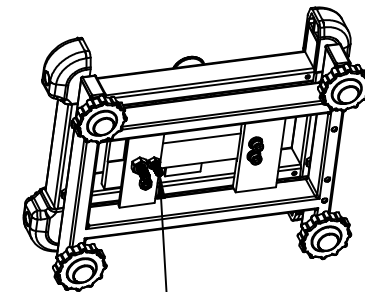
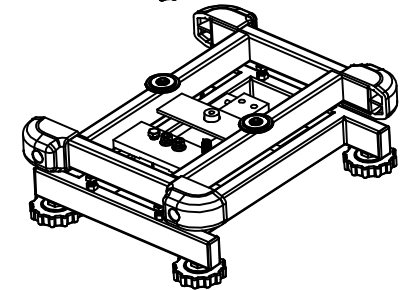
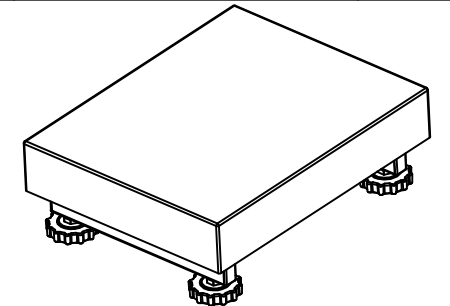
TOLERANCE UNLESS OTHERWISE SPECIFIED		<i>KERN® KERN & SOHN GmbH</i>			
DEC	ANGLES				
±0.1 FOR 0.X	±0.5				
±0.05 FOR 0.XX					
 3RD ANGLE PROJECTION					
DRAWN	Y.J.Zhao	TITLE: TKFP 3V20M-A with feet TKFP 6V20M-A with feet			
CHECKED	Tim.Zhao	MODEL NO.	PB2323-3K-KERN PB2323-6K-KERN		PART NO. 1308004.00001 1308004.00002
APPROVED	Tim.Zhao	MATERIAL			FINISH
UNIT	mm	SCALE	DO NOT SCALE DRAWING		SHEET OF

A4



REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A0	Released	2023.9.19	TimZhao



Transport protection screw

TOLERANCE UNLESS
OTHERWISE SPECIFIED
DEC ANGLES
±0.1 FOR 0.X
±0.05 FOR 0.XX

3RD ANGLE PROJECTION

DRAWN Y.J.Zhao

CHECKED Tim.Zhao

APPROVED Tim.Zhao

UNIT mm

KERN® KERN & SOHN GmbH

TITLE: TKFP 6V20LM-A with feet
TKFP 15V20M-A with feet
TKFP 30V20SM-A with feet

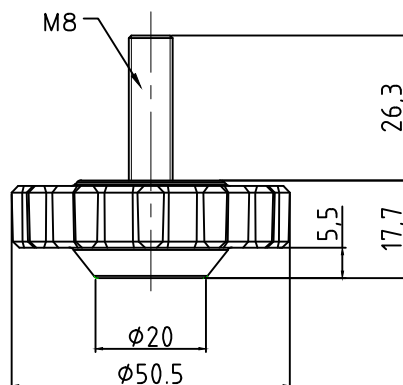
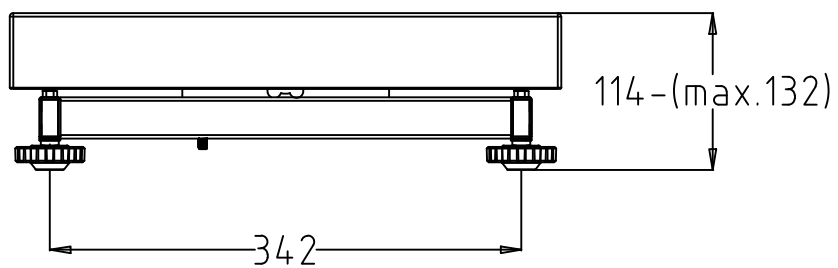
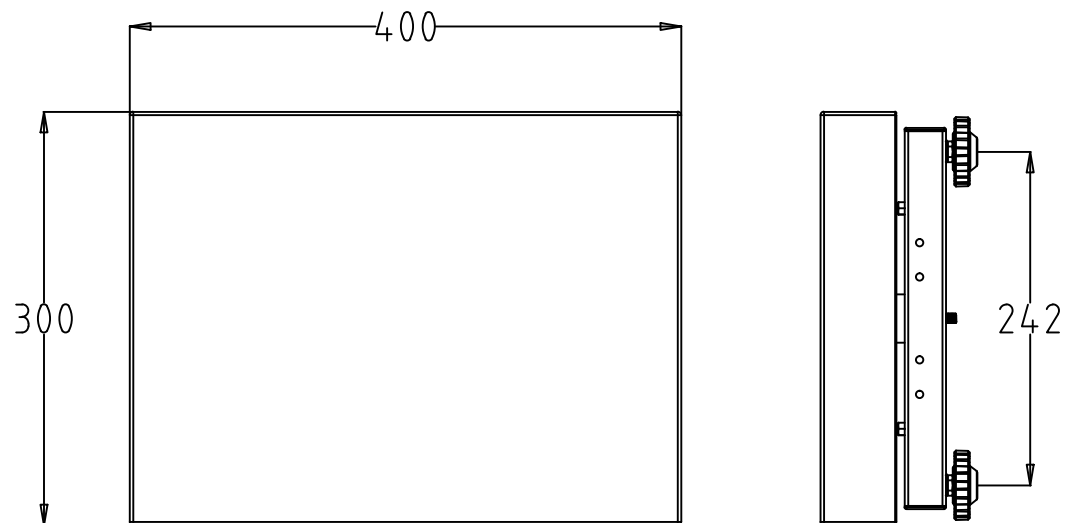
MODEL NO. PB3024-6K-KERN
PB3024-15K-KERN
PB3024-30K-L6D-KERN

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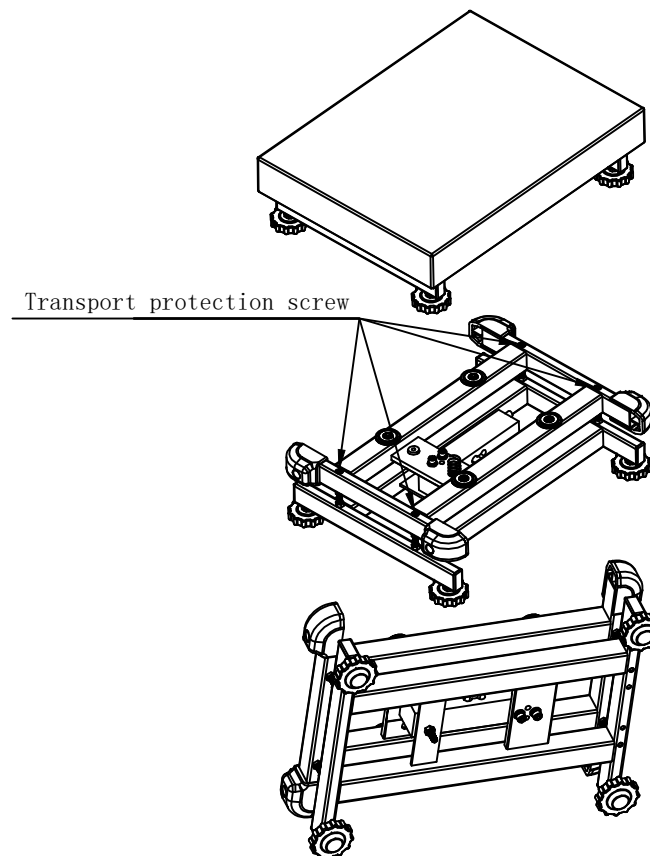
MATERIAL FINISH

SCALE DO NOT SCALE DRAWING SHEET OF

A4

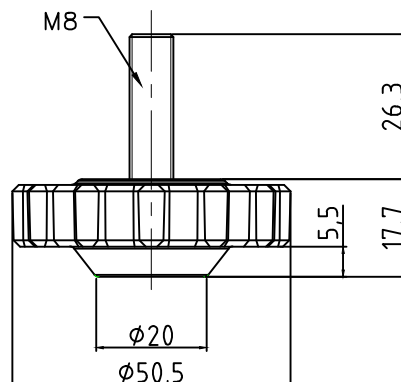
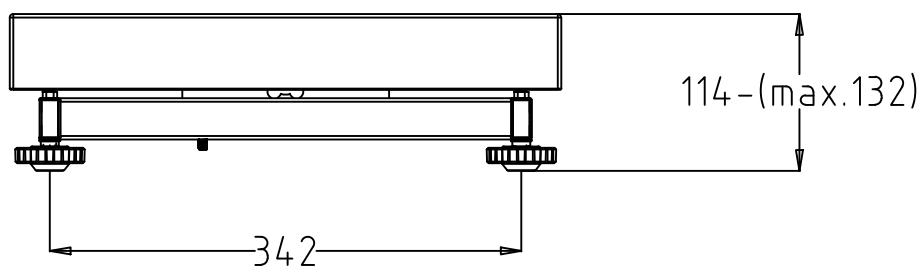
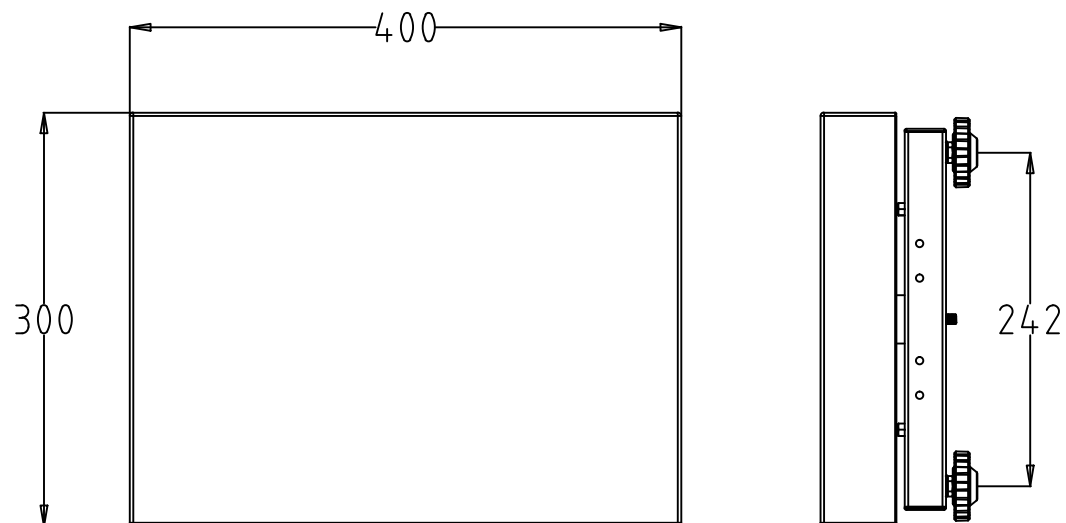


REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A0	Released	2023.9.19	Tim.Zhao

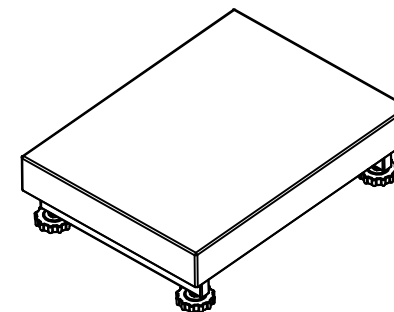


TOLERANCE UNLESS OTHERWISE SPECIFIED DEC ±0.1 FOR 0.X ±0.05 FOR 0.XX		3RD ANGLE PROJECTION		KERN® KERN & SOHN GmbH	
		±0.5		TITLE: TKFP 15V20LM-A with feet	
DRAWN	Y.J.Zhao	MODEL NO.		PART NO.	130800700009
CHECKED	Tim.Zhao	MATERIAL		FINISH	
APPROVED	Tim.Zhao	SCALE		DO NOT SCALE DRAWING	SHEET OF
UNIT	mm				

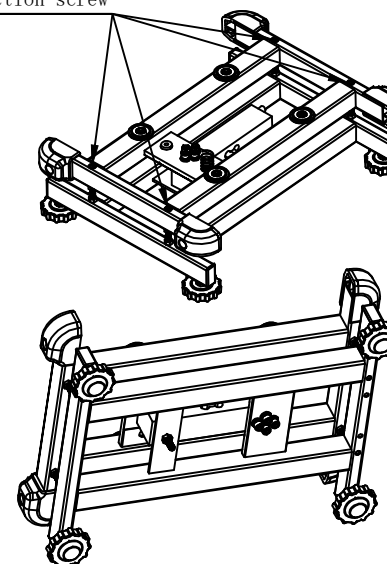
A4



REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A0	Released	2023.9.19	Tim.Zhao

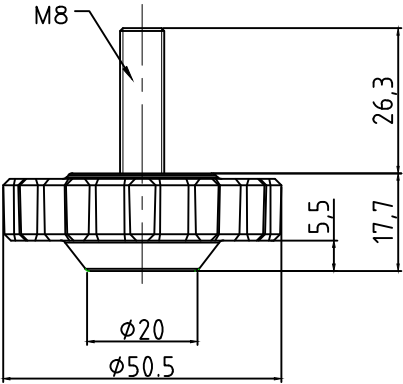
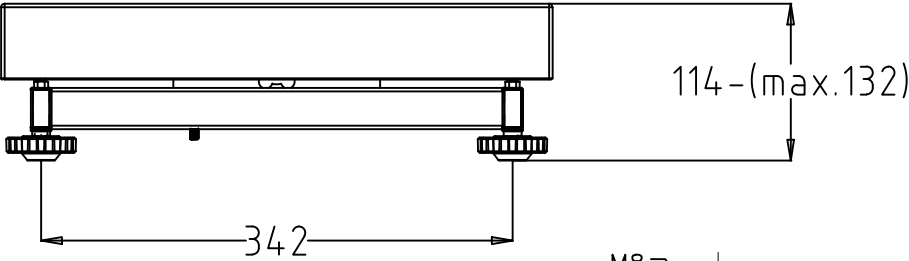
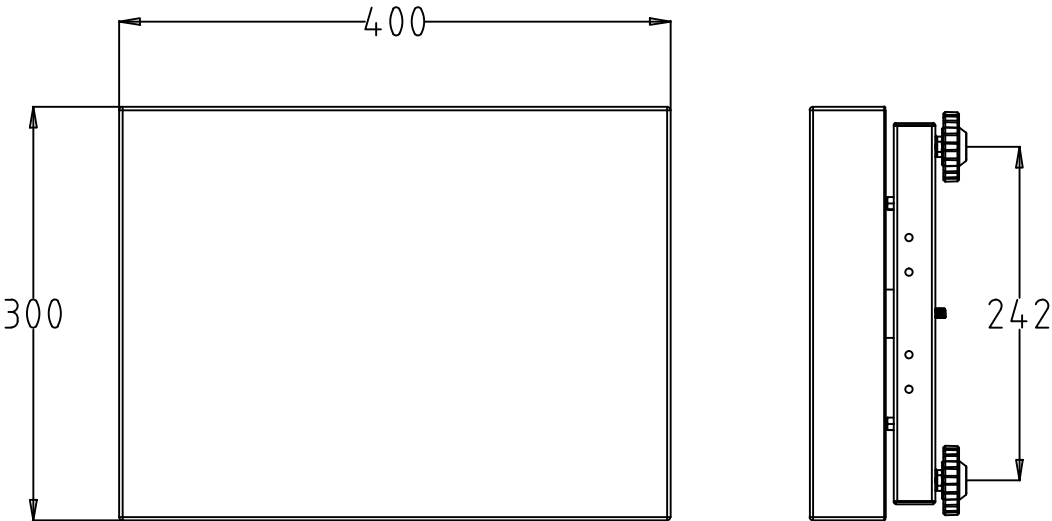


Transport protection screw

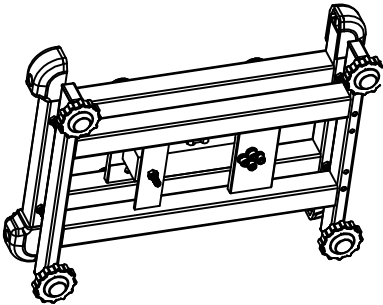
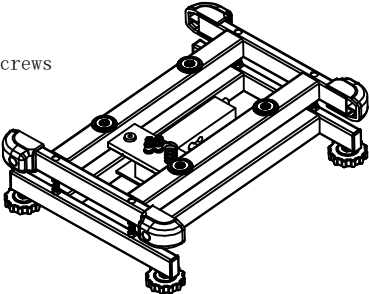
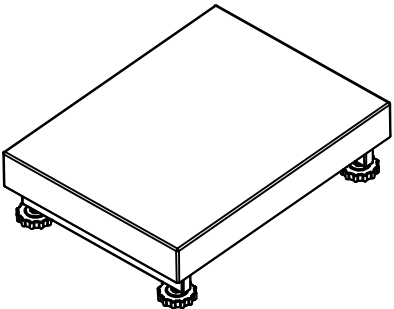


TOLERANCE UNLESS OTHERWISE SPECIFIED DEC ANGLES ±0.1 FOR 0.X ±0.05 FOR 0.XX		±0.5		KERN® KERN & SOHN GmbH	
		3RD ANGLE PROJECTION		TITLE: TKFP 30V20M-A with feet	
DRAWN	Y.J.Zhao	MODEL NO.		PART NO.	130800700002
CHECKED	Tim.Zhao	MATERIAL		FINISH	
APPROVED	Tim.Zhao	SCALE		DO NOT SCALE DRAWING	SHEET OF
UNIT	mm				

A4



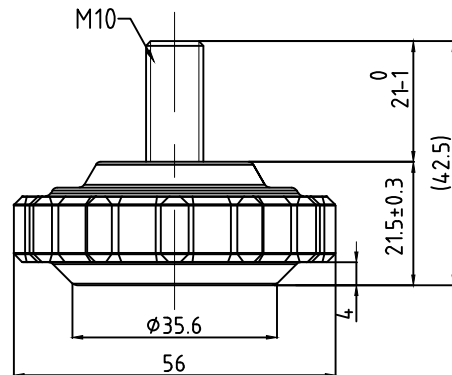
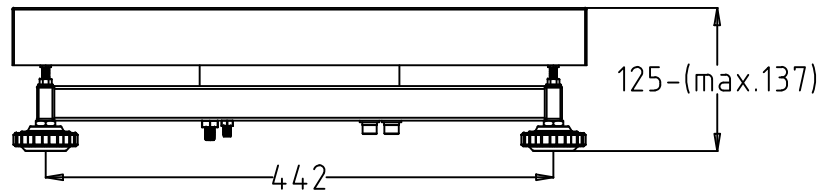
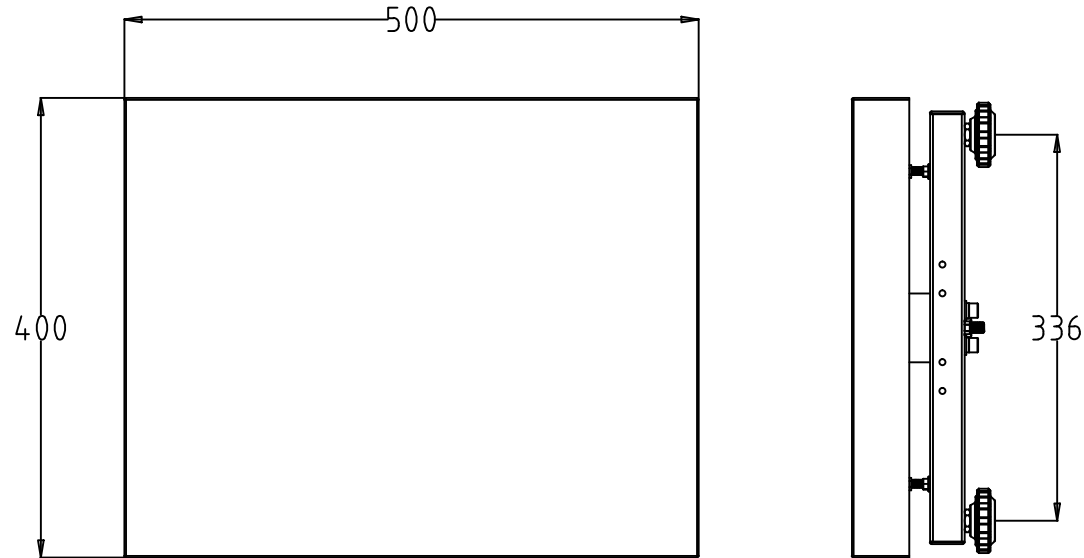
No transport protection screws



REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A0	Released	2023.9.19	Tim.Zhao

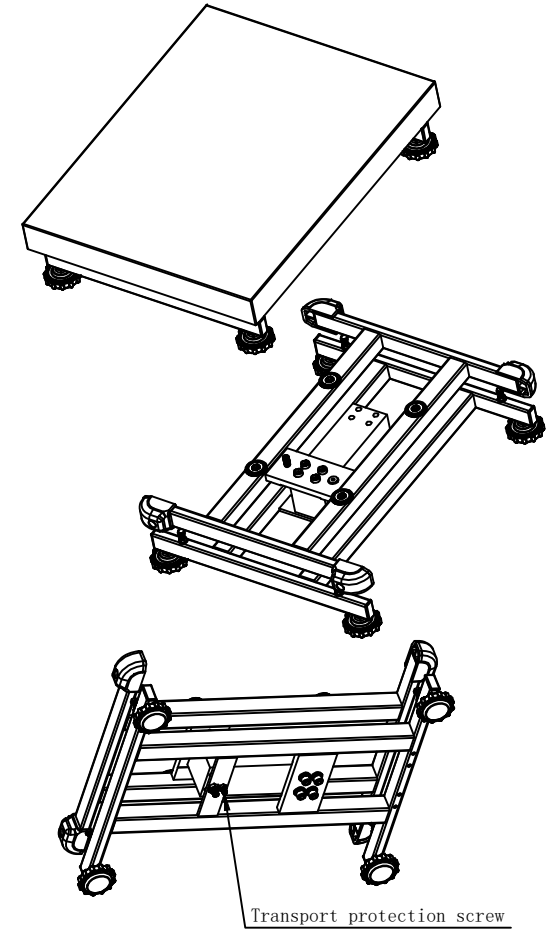
TOLERANCE UNLESS OTHERWISE SPECIFIED DEC ANGLES ±0.1 FOR 0.X ±0.05 FOR 0.XX ±0.5		KERN® KERN & SOHN GmbH			
 3RD ANGLE PROJECTION		TITLE:		TKFP 60V20M-A with feet	
DRAWN	Y.J.Zhao				
CHECKED	Tim.Zhao	MODEL NO.	PB4030-60K-KERN	PART NO.	130800700004
APPROVED	Tim.Zhao	MATERIAL		FINISH	
UNIT	mm	SCALE	DO NOT SCALE DRAWING		SHEET OF

A4



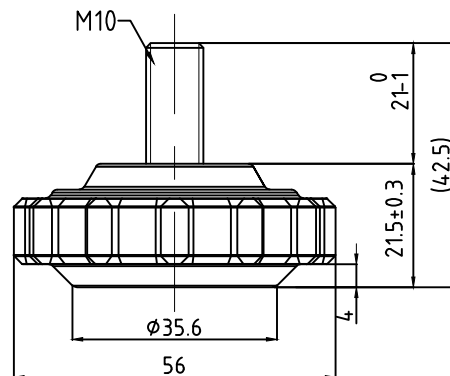
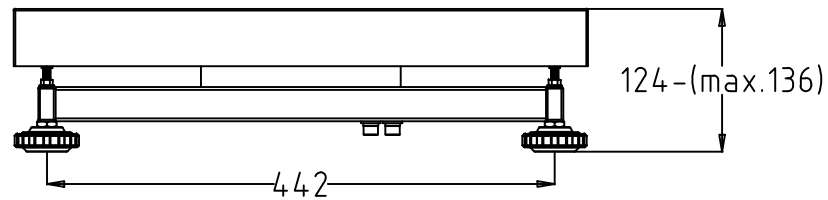
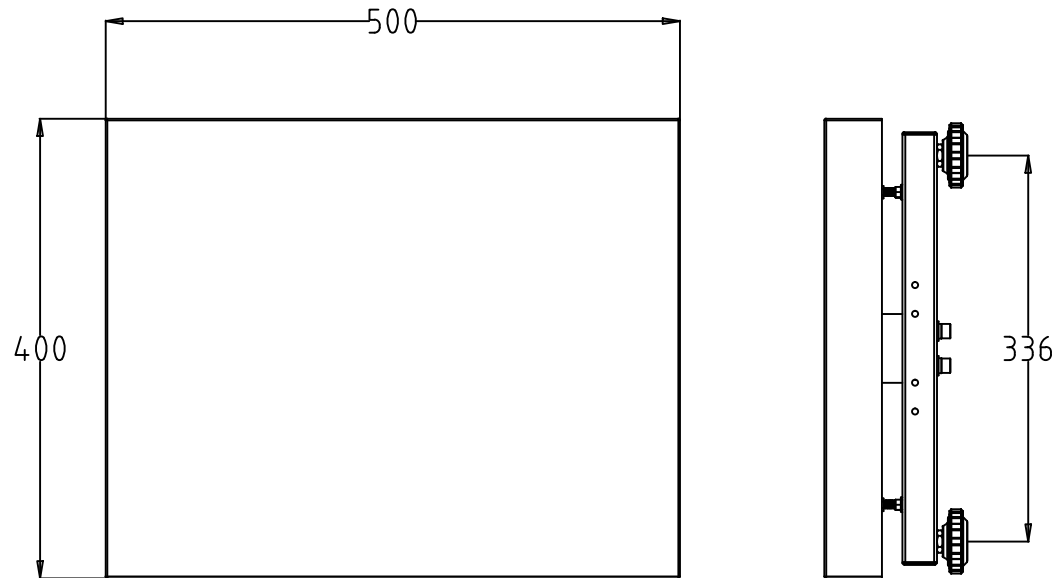
REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A0	Released	2023.9.19	Tim.Zhao



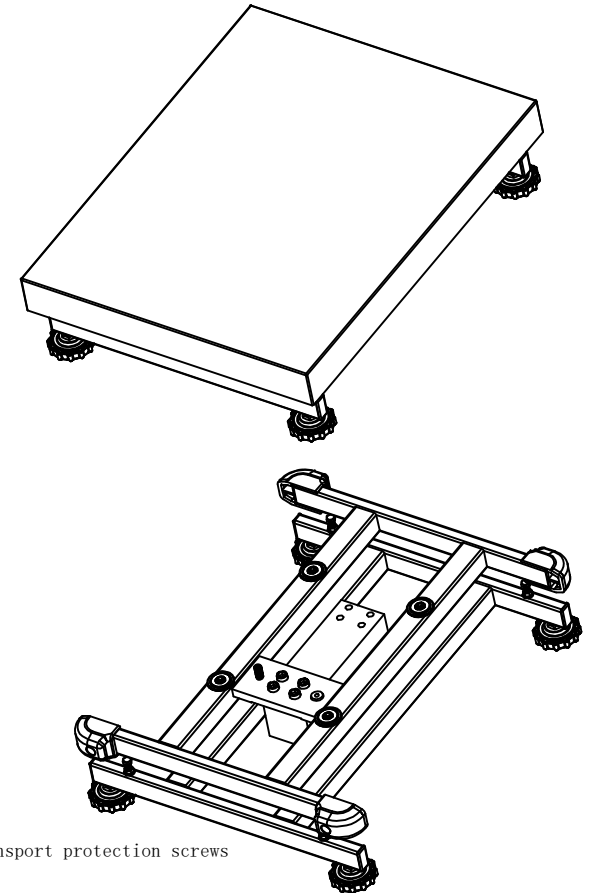
TOLERANCE UNLESS OTHERWISE SPECIFIED DEC ANGLES ±0.1 FOR 0.X ±0.05 FOR 0.XX		KERN® KERN & SOHN GmbH			
		TITLE: TKFP 30V20LM-A with feet			
DRAWN	Y.J.Zhao	MODEL NO.	PB5040-30K-KERN	PART NO.	130801200027
CHECKED	Tim.Zhao	MATERIAL		FINISH	
APPROVED	Tim.Zhao	SCALE		DO NOT SCALE DRAWING	SHEET OF
UNIT	mm				

A4



REVISIONS

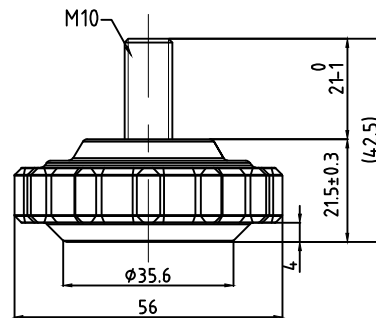
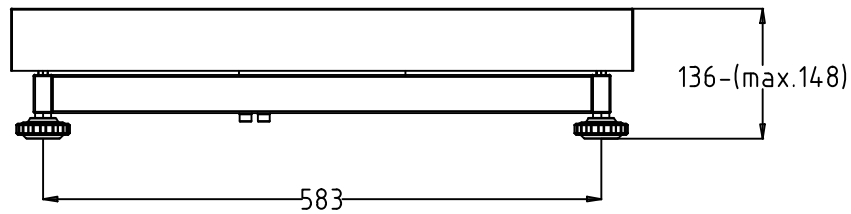
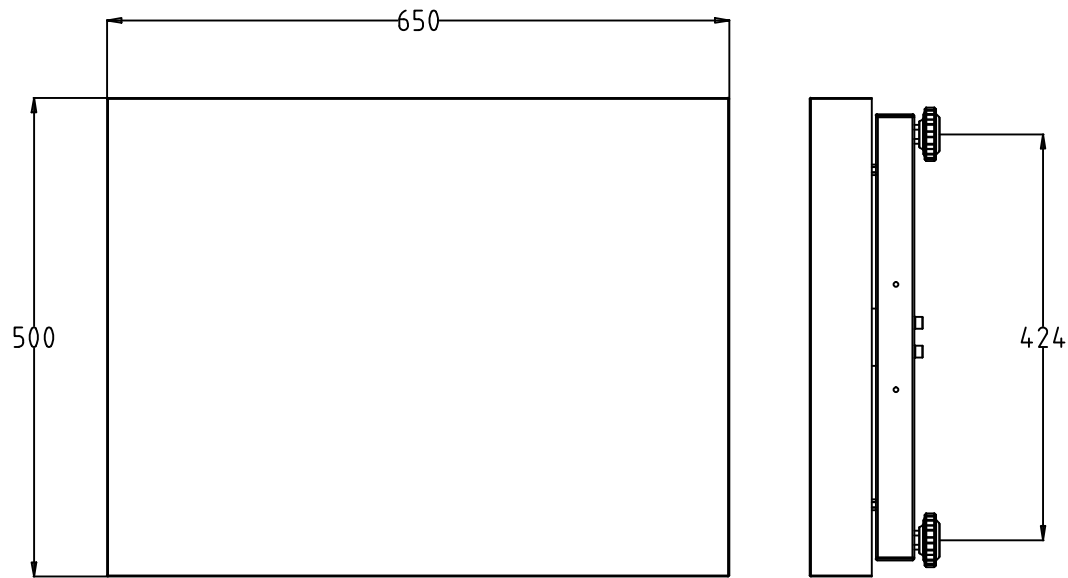
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A0	Released	2023.9.19	Tim.Zhao



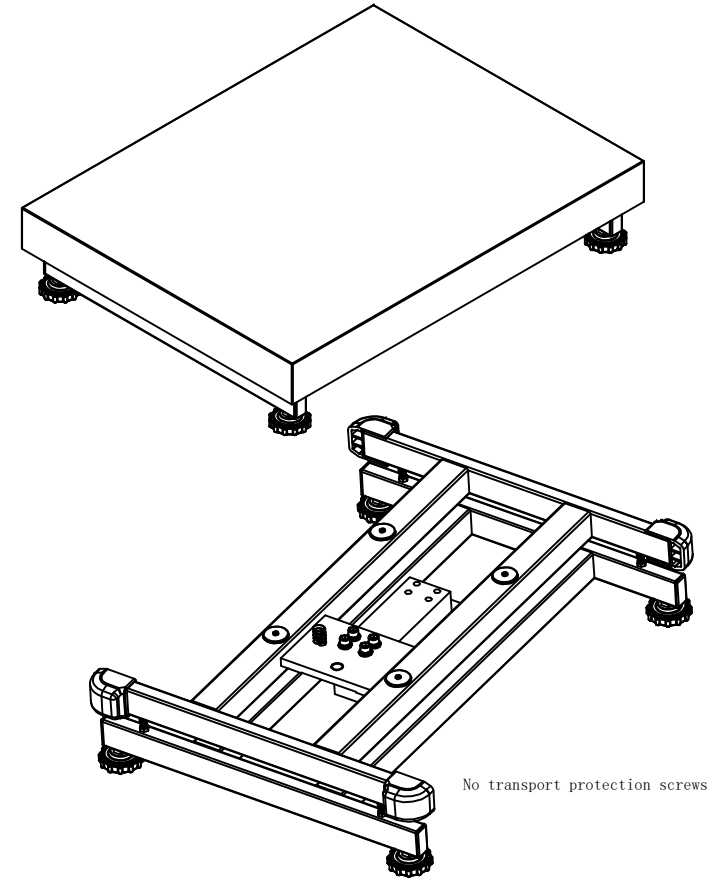
No transport protection screws

TOLERANCE UNLESS OTHERWISE SPECIFIED DEC ANGLES ±0.1 FOR 0.X ±0.05 FOR 0.XX		±0.5		<i>KERN® KERN & SOHN GmbH</i>		
 3RD ANGLE PROJECTION		TITLE: TKFP 60V20LM-A with feet TKFP 150V20M-A with feet				
DRAWN	Y.J.Zhao					
CHECKED	Tim.Zhao	MODEL NO. PB5040-60K-KERN PB5040-150K-KERN	PART NO. 130801200024 130801200023			
APPROVED	Tim.Zhao					
UNIT	mm	SCALE		DO NOT SCALE DRAWING	SHEET OF	

A4



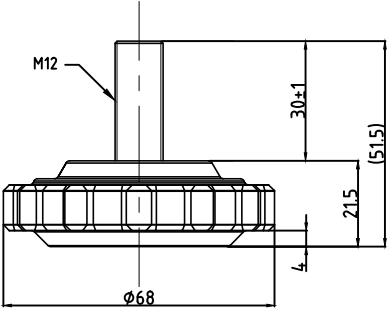
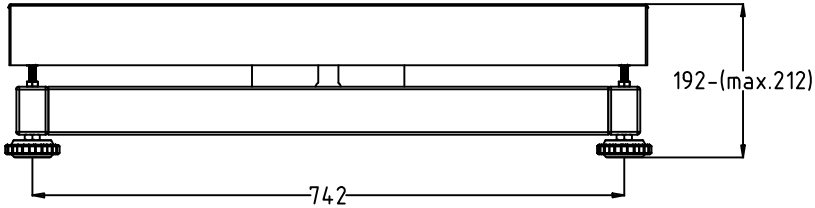
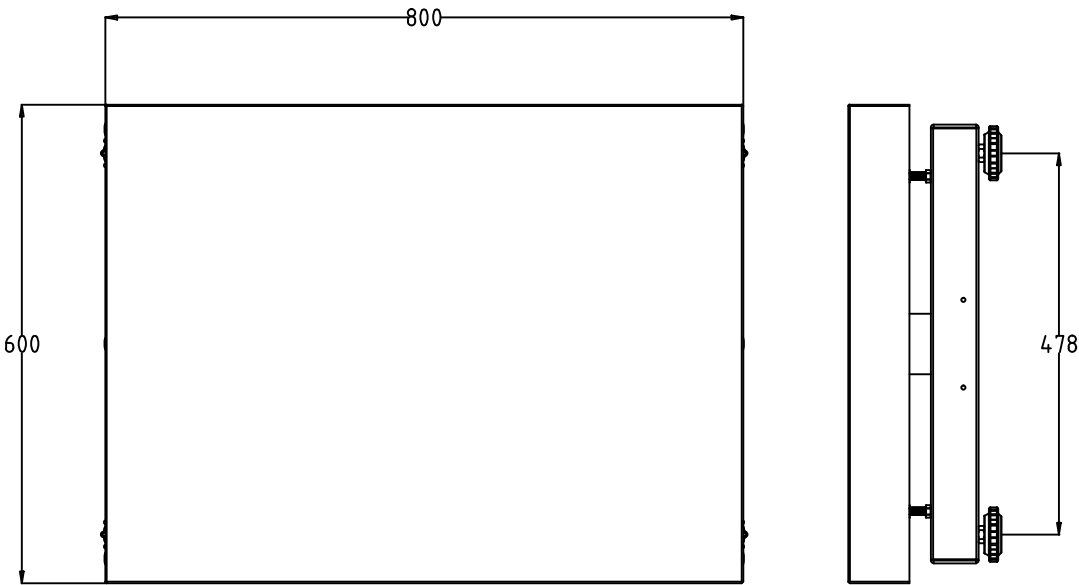
REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A0	Released	2023.9.19	Tim.Zhao



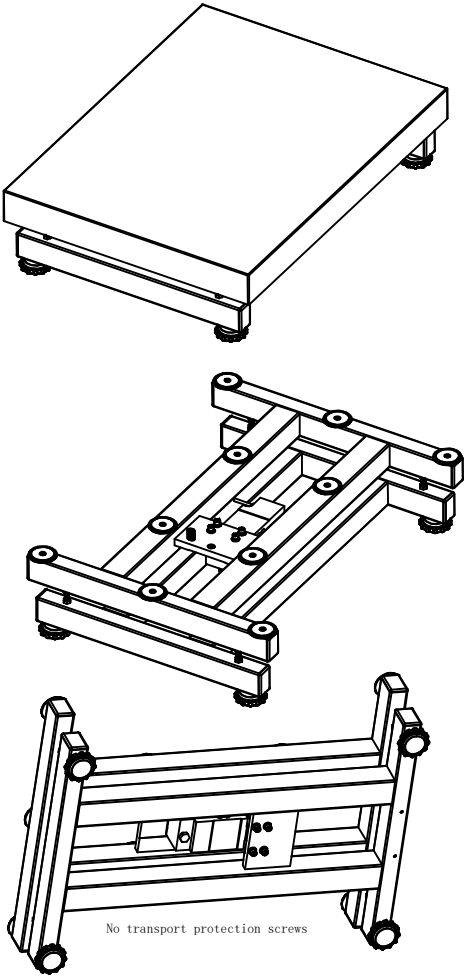
No transport protection screws

TOLERANCE UNLESS OTHERWISE SPECIFIED DEC ANGLES ±0.1 FOR 0.X ±0.05 FOR 0.XX		<u>KERN</u>® KERN & SOHN GmbH			
3RD ANGLE PROJECTION		TITLE: TKFP 150V20LM-A with feet TKFP 300V20M-A with feet			
DRAWN	Y.J.Zhao				
CHECKED	Tim.Zhao	MODEL NO.	PB6550-150K-KERN PB6550-300K-KERN	PART NO.	130801300005 130801300006
APPROVED	Tim.Zhao	MATERIAL		FINISH	
UNIT	mm	SCALE		DO NOT SCALE DRAWING	SHEET OF

A4



REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A0	Released	2023.9.19	Tim.Zhao



TOLERANCE UNLESS OTHERWISE SPECIFIED DEC ANGLES ±0.1 FOR 0.X ±0.05 FOR 0.XX		KERN® KERN & SOHN GmbH		
		3RD ANGLE PROJECTION		
DRAWN	Y.J.Zhao	TITLE: TKFP 600V20M-A with feet		
CHECKED	Tim.Zhao	MODEL NO.	PB6080-600K-KERN	PART NO. 130800300017
APPROVED	Tim.Zhao	MATERIAL		FINISH
UNIT	mm	SCALE	DO NOT SCALE DRAWING	
				SHEET OF