

HAIMER®
Quality Wins.

3D センサー SENSORS

測定装置
Measuring Instruments



www.haimer.com



測定技術

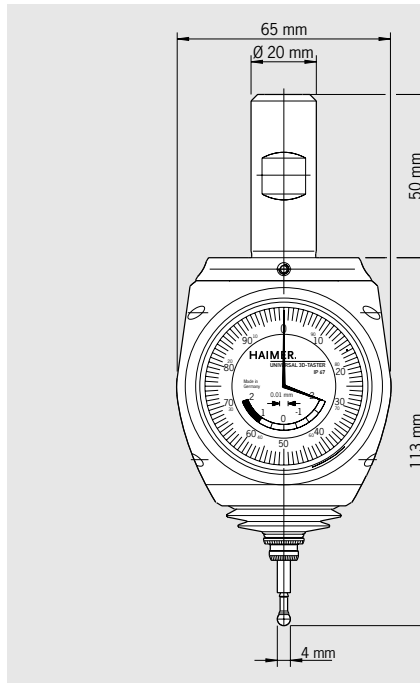
MEASURING TECHNOLOGY

3Dセンサー(アナログ)/3D-Sensors mechanical	
ユニバーサル 3Dセンサー/Universal 3D-Sensor	4
ユニバーサル 3Dセンサー(スティーブテーパー 一体型タイプ)/Universal 3D-Sensor with integrated adapter	6
3Dセンサー New Generation/3D-Sensor New Generation	8
3Dセンサー New Generation(各種ツールシャンク 一体型タイプ)/3D-Sensor with integrated short adapter	10
3Dセンサー(デジタル)/3D-Sensors digital	
3Dセンサー(デジタル)/3D-Sensor Digital	12
3Dセンサー デジタル(スティーブテーパー 一体型タイプ)/3D-Sensor Digital with integrated adapter	14
3Dセンサー ゼロマスター /3D-Sensors Zero Master	
3Dセンサー ゼロマスター/3D-Sensor Zero Master	16
3Dセンサー ゼロマスター(各種ツールシャンク 一体型タイプ)/3D-Sensor Zero Master with integrated short adapter	18
芯出し装置 セントロ/Coaxial indicator Centro	
セントロ/Centro	20
セントロ(ツールシャンク 一体型タイプ)/Centro with integrated adapter	22
キャリブレーションセット/Machine tool calibration set	
キャリブレーションセット/Machine tool calibration set	24

ユニバーサル 3Dセンサー Universal 3D-Sensor



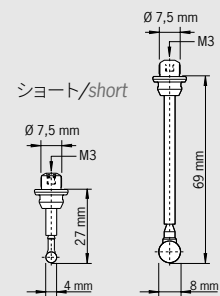
ユニバーサル 3Dセンサー UNIVERSAL 3D-SENSOR



プローブ先端/probe tips

ロング/long

ショート/short



ユニバーサル 3Dセンサー

ユニバーサル 3Dセンサーはフライス盤、放電加工機等(絶縁プローブ)に使用する高精度且つ多様性の測定器です。この測定器は機械の主軸に取り付けられ、機械主軸を任意に加工作物や治具上へ位置決めを行ったり、これらの寸法を迅速に且つ簡単に測定する装置です。XYZ軸のどの方向にも測定できます。ダイヤルゲージの針は常に同じ方向へ回転します。このダイヤルゲージは機械主軸と加工物の距離を示しています。ダイヤルゲージの針が「0」を指した状態は、機械主軸が加工物側面上に位置していることを意味します。この測定器の場合、短時間で測定が実施でき、測定子分の寸法補正を必要としない為、1回の測定ですべてが完了します。

作業が簡単且つ迅速に行える為、非生産時間の削減及び生産性や作業精度が向上します。測定子(プローブ)にはショートタイプとロングタイプがあります。これらの交換作業に工具は必要としません。

また、プローブ交換後はキャリブレーションを必要としません。加えて、本測定器の安全性としてオーバーラン時のプローブのブレーキングを設定しています。

これにより、本測定器を安全に長く使用して頂けます。すべての3Dセンサーが最高精度を保つ為に、HAIMER社は組立て時に必ず1台ずつ品質検査を実施しています。

- 防水保護等級:IP67

Universal 3D-Sensor



The Universal 3D-Sensor is a very precise and versatile measuring instrument for milling and EDM machines (insulated probe). Once clamped into the machine spindle, the run-out (T.I.R) is fully adjustable to Zero. Then, it can be used to bring the spindle axis on the edges of the workpiece. This allows to set zeros and to measure quickly and easily. approachability in any direction (X-, Y-, Z- axis). When the dial gage shows zero, the spindle axis is exactly on the edge of the workpiece.

No calculating of the probe's ball diameter is necessary – just Zero it out! Problems with mathematics or calculations are eliminated. It helps increasing the productivity and accuracy of the operator.

Short and long probes are available. The sensor probes may be changed without any tool, no re-calibration of the unit is needed.

Additional safety, the unit has a large overrun distance in connection with the fully tested preset breaking points giving the sensor long life. All Universal 3D-Sensors are individually tested and adjusted when being assembled in order to achieve a maximum of measuring precision.

- IP 67 waterproof

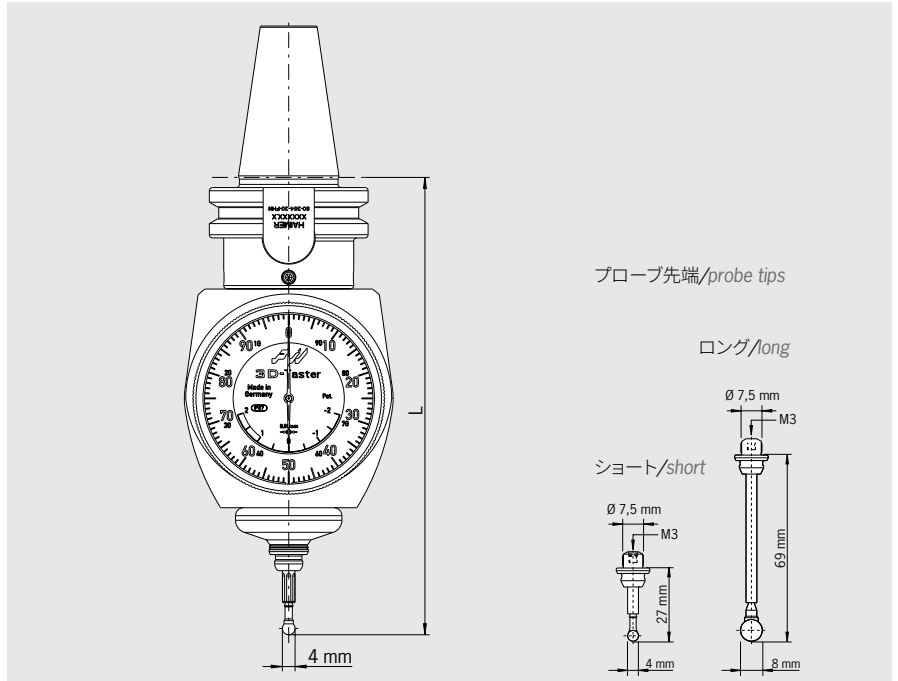
技術資料/Technical details	
ユニバーサル 3D センサー(クランプシャックØ 20mm、ショートプローブ Ø 4 mm付き) Universal 3D-Sensor with clamping shank Ø 20 mm including short probe tip Ø 4 mm	
精度/Accuracy	0,01 mm
寸法(テーパ部含まず)/Length without clamping shank	113 mm
注文番号/Order No. 80.360.00.FHN	
別売りオプション/Accessories	
ショートプローブ Ø 4mm/Short probe tip Ø 4 mm	
注文番号/Order No. 80.362.00	
ロングプローブ Ø 8mm/Long probe tip Ø 8 mm	
注文番号/Order No. 80.363.00	

推奨するHAIMER社製ツールホルダー Recommended HAIMER tool holders	
	注文番号/Order No.
SK40(短いタイプ)/short chuck SK40	40.305.20
SK50(短いタイプ)/short chuck SK50	50.300.20
BT40(短いタイプ)/short chuck BT40	40.500.20
BT50(短いタイプ)/short chuck BT50	50.500.20
HSK-A50(短いタイプ)/short chuck HSK-A50	A50.000.20
HSK-E50(短いタイプ)/short chuck HSK-E50	E50.000.20
HSK-A63(短いタイプ)/short chuck HSK-A63	A63.000.20
HSK-A80(短いタイプ)/short chuck HSK-A80	A80.000.20
HSK-A100(短いタイプ)/short chuck HSK-A100	A10.000.20

ユニバーサル 3Dセンサー
(スティープテーパー 一体型タイプ)
Universal 3D-Sensor with integrated adapter



ユニバーサル 3Dセンサー(スティープテーパー 一体型タイプ) UNIVERSAL 3D-SENSOR WITH INTEGRATED ADAPTER



ユニバーサル 3Dセンサー(スティープテーパー 一体型タイプ)

BT40(JIS B 6339)一体型タイプは操作性が高く、最高の作業快適性を保証します。

ユニバーサル 3Dセンサーはフライス盤、放電加工機等(絶縁プローブ)に使用する高精度且つ多様性の測定器です。この測定器は機械の主軸に取り付けられ、機械主軸を任意に加工物や治具上へ位置決めを行ったり、これらの寸法を迅速に且つ簡単に測定する装置です。XYZ軸のどの方向にも測定できます。ダイヤルゲージの針は常に同じ方向へ回転します。このダイヤルゲージは機械主軸と加工物の距離を示しています。ダイヤルゲージの針が「0」を指した状態は、機械主軸が加工物側面上に位置していることを意味します。

この測定器の場合、短時間で測定が実施でき、測定子分の寸法補正を必要としない為、1回の測定ですべてが完了します。作業が簡単且つ迅速に行える為、非生産時間の削減及び生産性や作業精度が向上します。測定子(プローブ)にはショートタイプとロングタイプがあります。これらの交換作業に工具は必要としません。

また、プローブ交換後はキャリブレーションを必要としません。加えて、本測定器の安全性としてオーバーラン時のプローブのブレーキングを設定しています。

これにより、本測定器を安全に長く使用して頂けます。すべての3Dセンサーが最高精度を保つ為に、HAIMER社は組立て時に必ず1台ずつ品質検査を実施しています。

- 防水保護等級:IP67

Universal 3D-Sensor with integrated adapter

The integrated taper (DIN 69871, SK40 or JIS B6339, BT40) guarantees easiest handling and a maximum of comfort.

The Universal 3D-Sensor is a very precise and versatile measuring instrument for milling and EDM machines (insulated probe). Once clamped into the machine spindle, the run-out (T.I.R) is fully adjustable to Zero. Then, it can be used to bring the spindle axis on the edges of the workpiece. This allows to set zeros and to measure quickly and easily. approachability in any direction (X-, Y-, Z- axis). When the dial gage shows zero, the spindle axis is exactly on the edge of the workpiece.

No calculating of the probe's ball diameter is necessary – just Zero it out! Problems with mathematics or calculations are eliminated. It helps increasing the productivity and accuracy of the operator.

Short and long probes are available. The sensor probes may be changed without any tool, no re-calibration of the unit is needed.

Additional safety, the unit has a large overrun distance in connection with the fully tested preset breaking points giving the sensor long life. All Universal 3D-Sensors are individually tested and adjusted when being assembled in order to achieve a maximum of measuring precision.

- IP 67 waterproof

技術資料/Technical details

ユニバーサル 3D センサー(スティープテーパー 一体型タイプ、ショートプローブ Ø 4 mm付き)
Universal 3D-Sensor with integrated adapter including short probe tip Ø 4 mm

精度/Accuracy	0,01 mm
寸法(テーパー部含まず)/Length without clamping shank	113 mm
商品名/Article	注文番号/Order No. L [mm]
SK30一体型タイプ/with integrated adapter SK 30	80.364.30.FHN 144,0
SK40一体型タイプ/with integrated adapter SK 40	80.364.40.FHN 143,9
BT30一体型タイプ/with integrated adapter BT 30	80.365.30.FHN 143,5
BT40一体型タイプ/with integrated adapter BT 40	80.365.40.FHN 143,9

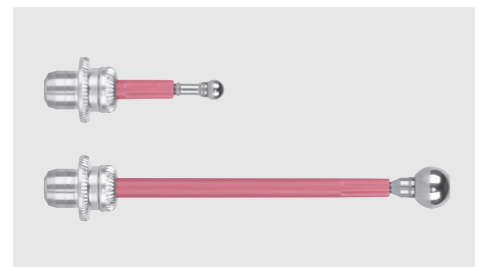
別売りオプション/Accessories

ショートプローブ Ø 4mm/Short probe tip Ø 4 mm

注文番号/Order No. 80.362.00

ロングプローブ Ø 8mm/Long probe tip Ø 8 mm

注文番号/Order No. 80.363.00



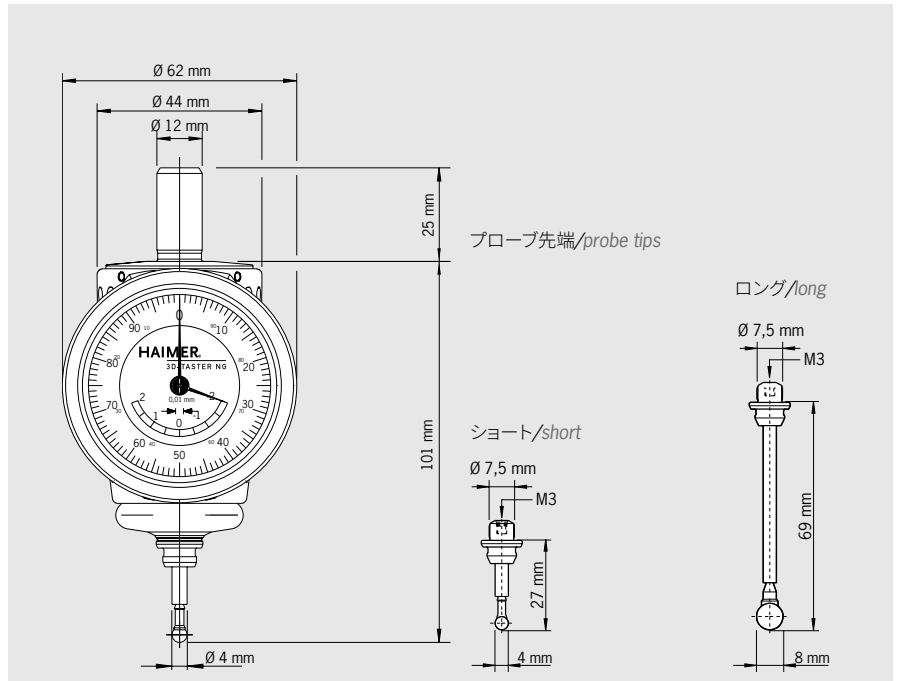
ショートプローブ Ø 4mm/Short probe tip Ø 4 mm
ロングプローブ Ø 8mm/Long probe tip Ø 8 mm

3Dセンサー New Generation 3D-Sensor New Generation



3Dセンサー NEW GENERATION

3D-SENSOR NEW GENERATION



3Dセンサー New Generation

3D-センサーNGは世界中で証明され受け入れられ、更に進化したユニバーサルな3Dセンサーです。明確な特徴としては改良されたメカニズムと新しいコンパクトなデザインです。

長所:

- コンパクトで持ちやすいボディと制限のない作業範囲
- スピンドルの位置からでも見やすい正確で大きなダイヤルゲージ(1/100mm単位)
- 最高精度:0.01mm (HAIMER社 プローブ使用時)
- オーバーラン距離マークの表示 (安全距離)
- 防水保護等級:IP67

機能:

- スピンドル中心と加工物端面との位置決め (XYZ軸)
- ゼロセット
- 穴内径、ボス外径の測定
- 長さや深さの測定
- 面の真直度、平面度のチェック
- 加工物と治具の平行出し
- 素早く作業でき、測定子分の寸法補正や読み取りミス無し

3D-Sensor New Generation

The 3D-Sensor NG is a further development of our worldwide accepted and proven Universal 3D-Sensor. Its distinguishing features are improved mechanics and a new and compact design.

Advantages:

- Compact and easy to grip casing, no restriction to working area
- Precise display of spindle position with large 1/100 mm dial gauge (2 hands)
- Utmost precision of 0.01 mm (when using original HAIMER probe tips)
- Marked overrun distance (safety distance)
- IP 67 waterproof

Functions:

- Aligning machine spindles to work piece edges and reference edges (x-, y-, z-axis)
- Set zeros
- Centre borings and shafts
- Measuring lengths and depths
- Checking straightness and levelness of surfaces
- Aligning work pieces and vices
- Quick, without calculations, no mistakes with algebraic signs

技術資料/Technical details

3Dセンサー NG (クランプシャック $\varnothing 12$ mm、ショートプローブ $\varnothing 4$ mm付き)

3D-Sensor NG with clamping shank $\varnothing 12$ mm including short probe tip $\varnothing 4$ mm

精度/Accuracy 0,01 mm
寸法(テーパ部含まず)/Length without clamping shank 101 mm

注文番号/Order No. **80.360.00NG**

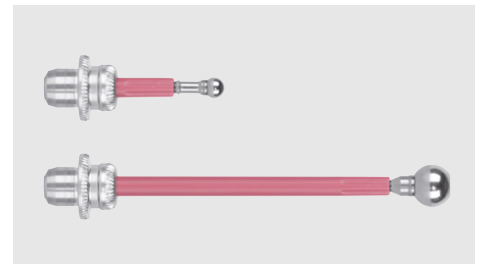
別売りオプション/Accessories

ショートプローブ $\varnothing 4$ mm/Short Probe tip $\varnothing 4$ mm

注文番号/Order No. **80.362.00**

ロングプローブ $\varnothing 8$ mm/Long Probe tip $\varnothing 8$ mm

注文番号/Order No. **80.363.00**

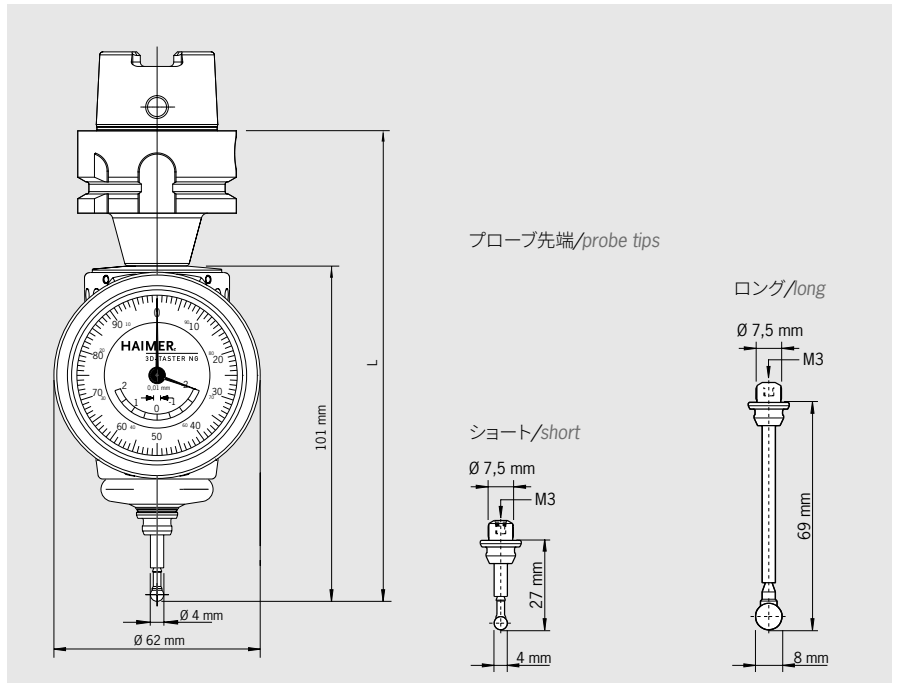


ショートプローブ $\varnothing 4$ mm/Short probe tip $\varnothing 4$ mm
ロングプローブ $\varnothing 8$ mm/Long probe tip $\varnothing 8$ mm

3Dセンサー New Generation (各種ツールシャンクー体型タイプ) 3D-Sensor NG with integrated short adapter



3Dセンサー NEW GENERATION(各種ツールシャンク一 体型タイプ) 3D-SENSOR NG WITH INTEGRATED SHORT ADAPTER



各種ツールシャンク(SK30, BT30, HSK-25/32/40/50/63)一体型 3Dセンサー

省スペースで簡単に加工物を測定

仕様:

- 各種ツールシャンク(SK30, BT30, HSK-A32/40/50/63, HSK-E25/32/40/50/63)一体型 3Dセンサー
- 出荷時に振れ精度を調整(0.01mm)している為、再設定必要なし
- 測定精度: 0.01mm
- ショート及びロングプローブの交換作業に工具は不要
- 再キャリブレーションは不要
- オーバーラン距離を拡大
- 防水保護等級: IP67

使い方:

- 小型フライス盤、放電加工機用(絶縁プローブ)
- 加工物の測定及び主軸の位置決め
- X,Y,Z軸のすべての方向へ操作可能

For interfaces SK30, BT30, HSK-25/32/40/50/63

Simple workpiece measuring with less space in the machine.

Version:

- With integrated short adapter in version SK30, BT30, HSK-A32/40/50/63, HSK-E25/32/40/50
- No further manual runout adjustment necessary! Delivery with preset runout accuracy at the probe tip of 0.01 mm
- Measuring accuracy: 0.01 mm
- Short and long probe tips available, no tool change necessary
- No re-calibration of the sensor is needed
- Enhanced overrun distance
- IP 67 waterproof

Application:

- For small Milling and EDM machines (isolated probe)
- For workpiece-reset and length measuring
- Any direction approach (X-, Y-, Z-axis)

技術資料/Technical details

3D センサー NG (各種ツールシャンク一体型タイプ、ショートプローブ Ø 4 mm 付き)

3D-Sensor NG with integrated short adapter including short probe tip Ø 4 mm

精度/Accuracy	0,01 mm		
商品名/Article	注文番号/Order No.	L [mm]	
3D センサー NG HSK-E25一体型タイプ/with short adapter	HSK-E25	80.363.E25NG	126,5
3D センサー NG HSK-E32一体型タイプ/with short adapter	HSK-E32	80.363.E32NG	136,5
3D センサー NG HSK-E40一体型タイプ/with short adapter	HSK-E40	80.363.E40NG	136,5
3D センサー NG HSK-E50一体型タイプ/with short adapter	HSK-E50	80.363.E50NG	143,5
3D センサー NG HSK-A32一体型タイプ/with short adapter	HSK-A32	80.363.A32NG	136,5
3D センサー NG HSK-A40一体型タイプ/with short adapter	HSK-A40	80.363.A40NG	136,5
3D センサー NG HSK-A50一体型タイプ/with short adapter	HSK-A50	80.363.A50NG	143,5
3D センサー NG HSK-A63一体型タイプ/with short adapter	HSK-A63	80.363.A63NG	147,0
3D センサー NG SK30一体型タイプ/with short adapter	SK30	80.364.30NG	136,1
3D センサー NG BT30一体型タイプ/with short adapter	BT30	80.365.30NG	135,5

別売りオプション/Accessories

ショートプローブ Ø 4mm/Short Probe tip Ø 4 mm

注文番号/Order No. **80.362.00**



ロングプローブ Ø 8mm/Long Probe tip Ø 8 mm

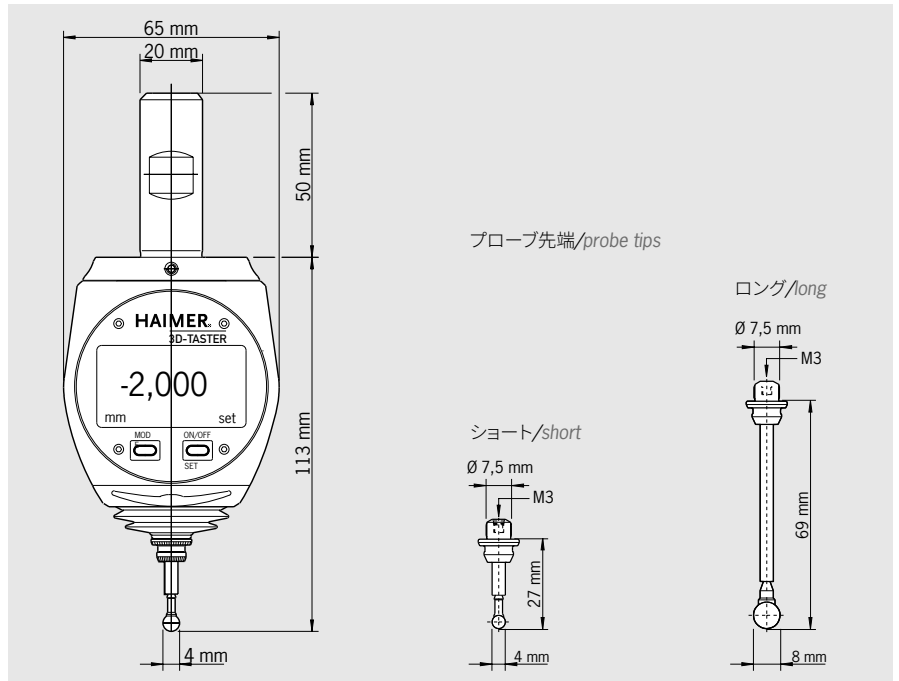
注文番号/Order No. **80.363.00**



3Dセンサー(デジタル) 3D-Sensor Digital



3Dセンサー(デジタル) 3D-SENSOR DIGITAL



3Dセンサー(デジタル)

高精度- 取り扱い安全

デジタル3Dセンサーは更に進化が証明されたメカニカルな3Dセンサーです。フライス盤や放電加工等の加工物の基準面に接触し使用されます。主軸中心は素早く安全に基準となる端面に位置決めされます。接近作業はそのままデジタル表示でモニターでき、ゼロポジションは最初の一回で検出できます。機械側の座標系設定は、主軸中心が確実に加工端面に位置決めされるため、なんの計算も要りません

特に実践で役に立つ

デジタルディスプレイは設定単位0,001 mm と大きな測定範囲を持ち、長い距離を簡単に読み取れます。(例: 大型のMCなどにて使用の場合) デジタルディスプレイは耐飛散性、防塵性を有し、また機械のATC装置に装着も可能です。

3D-Sensor Digital

Highly accurate – safe handling

The Digital 3D-Sensor is a further development of the time proven mechanical 3D-Sensor. It serves for approaching workpiece edges on milling and EDM machines. The spindle may be positioned quickly and safely on the references edge. The approaching operation can be exactly monitored on the digital display. The zero points can be set without any calculations because the spindle axis is positioned exactly on the approached edge.

Especially practical

The digital display has large numbers that measure in increments of 0.001 mm. It can be easily read from a long distance (i.e. when mounted on a large machining center). The digital display is water- and dust-proof (IP 64) and can be stored in the tool magazine of the machine.

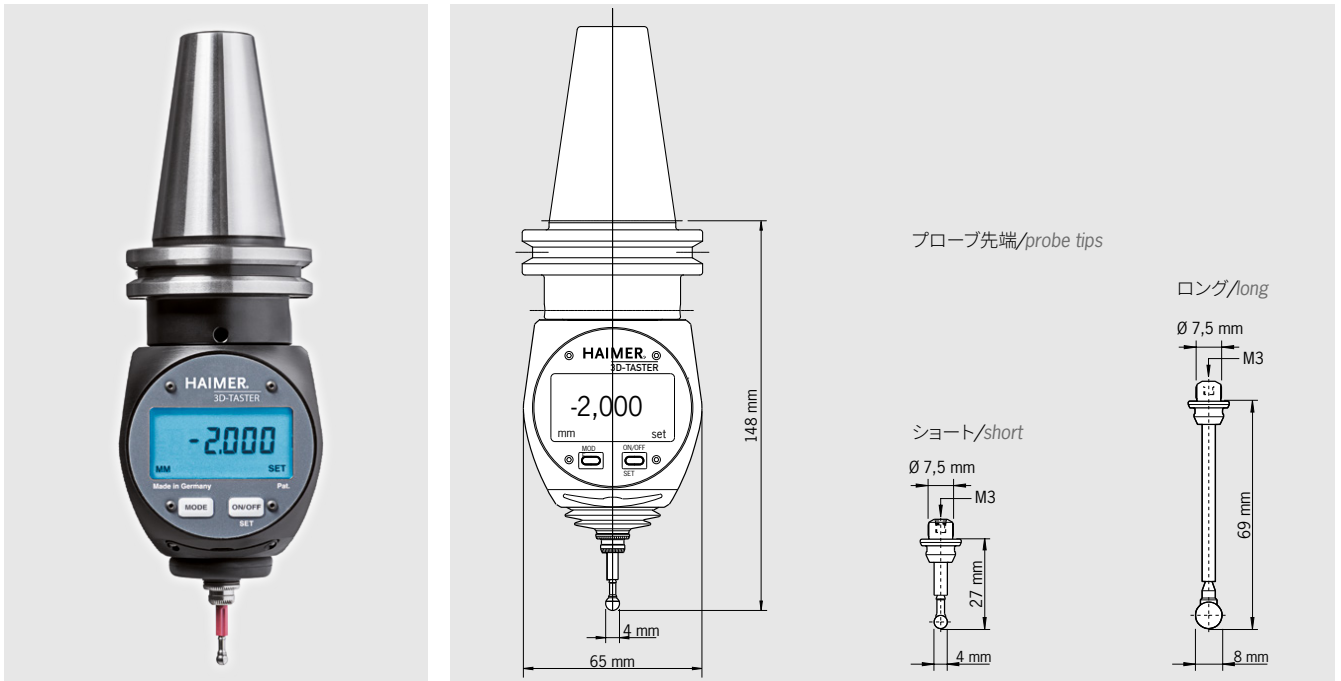
技術資料/Technical details	
3Dセンサーデジタル(クランプシャンク \varnothing 20mm、ショートプローブ \varnothing 4 mm付き) 3D-Sensor Digital with clamping shank \varnothing 20 mm incl. short probe tip \varnothing 4 mm	
最小測定単位/Smallest unit of measure	0,001 mm
繰り返し精度/Repeatability	0,005 mm
測定精度/Measuring accuracy	0,005 mm
ディスプレイ/Display	
表示方式	切り替え可能
Display mode	May be switched to inch or metric
ディスプレイサイズ/Display size	45x 23 mm
文字サイズ/Height of numbers	8,5 mm
バッテリー寿命(連続使用)	約3,000時間
Service life of battery (continuous operation) approx.	3000 hrs
注文番号/Order No. 80.460.00.FHN	
別売りオプション/Accessories	
ショートプローブ \varnothing 4mm/Short probe tip \varnothing 4 mm	
注文番号/Order No. 80.362.00	
ロングプローブ \varnothing 8mm/Long probe tip \varnothing 8 mm	
注文番号/Order No. 80.363.00	

推奨するHAIMER社製ツールホルダー Recommended HAIMER tool holders	
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SK50(短いタイプ)/short chuck SK50	50.300.20
BT40(短いタイプ)/short chuck BT40	40.500.20
BT50(短いタイプ)/short chuck BT50	50.500.20
HSK-A50(短いタイプ)/short chuck HSK-A50	A50.000.20
HSK-E50(短いタイプ)/short chuck HSK-E50	E50.000.20
HSK-A63(短いタイプ)/short chuck HSK-A63	A63.000.20
HSK-A80(短いタイプ)/short chuck HSK-A80	A80.000.20
HSK-A100(短いタイプ)/short chuck HSK-A100	A10.000.20

3Dセンサーデジタル
(スティープテーパー 一体型タイプ)
3D-Sensor Digital with integrated adapter



3Dセンサーデジタル(スティープテーパ ー一体型タイプ) 3D-SENSOR DIGITAL WITH INTEGRATED ADAPTER



3Dセンサーデジタル(スティープテーパ ー一体型タイプ)

BT40 (JIS B 6339) 一体型タイプで操作性が高く、最高の作業快適性を保証します。

高精度- 取り扱い安全

デジタル3Dセンサーは更に進化が証明されたメカニカルな3Dセンサーです。フライス盤や放電加工等の加工物の基準面に接触し使用されます。主軸中心は素早く安全に基準となる端面に位置決めされます。接近作業はそのままデジタル表示でモニターでき、ゼロポジションは最初の一回で検出できます。機械側の座標系設定は、主軸中心が確実に加工端面に位置決めされるため、なんの計算も要りません。

特に実践で役に立つ

デジタルディスプレイは設定単位0,001 mm と大きな測定範囲を持ち、長い距離を簡単に読み取れます。(例: 大型のMCなどにて使用の場合) デジタルディスプレイは耐飛散性、防塵性を有し、また機械のATC装置に装着も可能です。

3D-Sensor Digital with integrated adapter

The integrated taper (DIN 69871, SK40 or JIS B6339, BT40) guarantees easiest handling and a maximum of comfort.

Highly accurate – safe handling

The Digital 3D-Sensor is a further development of the time proven mechanical 3D-Sensor. It serves for approaching workpiece edges on milling and EDM machines. The spindle may be positioned quickly and safely on the references edge. The approaching operation can be exactly monitored on the digital display. The zero points can be set without any calculations because the spindle axis is positioned exactly on the approached edge.

Especially practical

The digital display has large numbers that measure in increments of 0.001 mm. It can be easily read from a long distance (i.e. when mounted on a large machining center). The digital display is water- and dust-proofed (IP 64) and can be stored in the tool magazine of the machine.

技術資料/Technical details

3Dセンサーデジタル(スティープテーパ ー一体型タイプ、ショートプローブ Ø 4 mm 付き)
3D-Sensor Digital with integrated adapter incl. short probe tip Ø 4 mm

最小測定単位/Smallest unit of measure	0,001 mm
繰り返し精度/Repeatability	0,005 mm
測定精度/Measuring accuracy	0,005 mm
ディスプレイ/Display	
表示方式	切り替え可能
Display mode	May be switched to inch or metric
ディスプレイサイズ/Display size	45x23 mm
文字サイズ/Height of numbers	8,5 mm
バッテリー寿命(連続使用)	約3,000時間
Service life of battery (continuous operation) approx.	3000 hrs
SK40 一体型タイプ/with integrated adapter SK 40	
注文番号/Order No.	80.464.40.FHN
BT40 一体型タイプ/with integrated adapter BT 40	
注文番号/Order No.	80.465.40.FHN

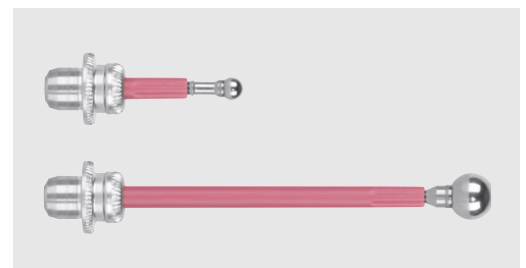
別売りオプション/Accessories

ショートプローブ Ø 4mm/Short probe tip Ø 4 mm

注文番号/Order No. **80.362.00**

ロングプローブ Ø 8mm/Long probe tip Ø 8 mm

注文番号/Order No. **80.363.00**



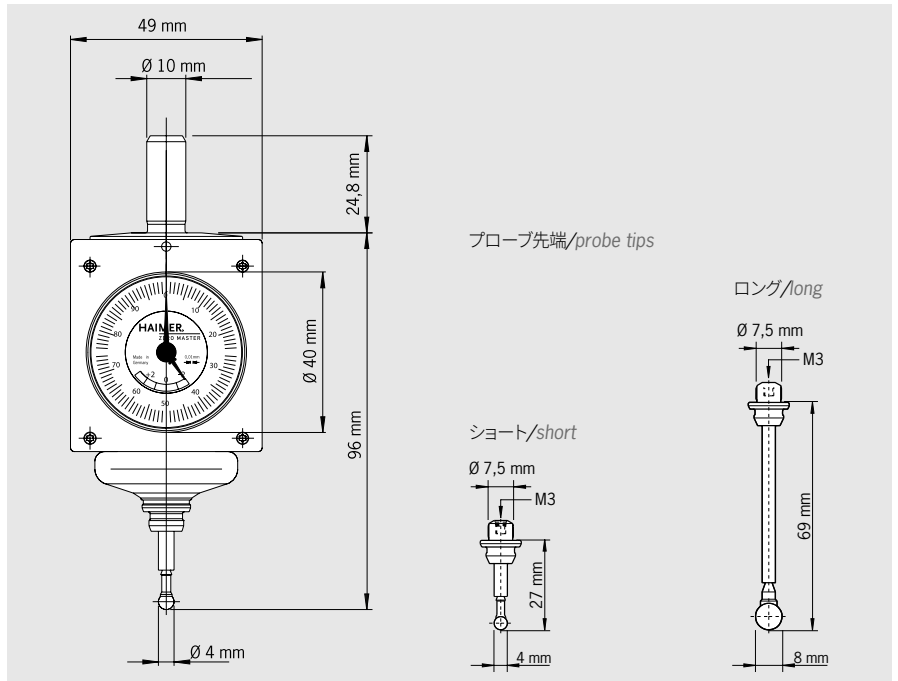
ショートプローブ Ø 4mm/Short probe tip Ø 4 mm
ロングプローブ Ø 8mm/Long probe tip Ø 8 mm

3Dセンサー ゼロマスター 3D-Sensor Zero Master



3Dセンサー ゼロマスター

3D-SENSOR ZERO MASTER



3Dセンサー ゼロマスター

小型でも有能

ゼロマスターは世界で一番小型の3Dセンサーです。使用方法、機能、精度はユニバーサル3Dセンサーと同様です。このゼロマスターは小型の機械に最適です。クランプシャンク径はφ10mmです。ISO30や小型HSK主軸をもつ小型機にも使用できます。本体も短く、主軸から大きく突き出さないため、加工物が大きくても測定が可能です。ゼロマスターのダイヤルゲージは小型でアナログ表示です。

ゼロマスターはショート(球径φ4mm)とロング(球径φ8mm)プローブ共に使用可能です。両プローブはHAIMER社製3Dセンサーに互換性があります。

ご注意:

下記測定精度:0.01mmはHAIMER社製の純正プローブを使用した場合のみです。

- 防水保護等級:IP67

Zero Master

Small but nice

The Zero Master is the smallest 3D-Sensor worldwide. Usage, function and accuracy are equal to the Universal 3D-Sensor. The size of the Zero Master is adapted to small machines. The diameter of the clamping shank is 10mm. Thus it can be also used on machines with ISO 30 or small HSK spindles. The housing is shortened and does not protrude far out of the spindle so even big work pieces can be measured. The Zero Master can be read with a small analog dial gauge.

The Zero Master can be equipped with a short (ball diam. 4 mm) and a long (ball diam. 8 mm) probe tip. The probe tips of course are compatible to all other HAIMER 3D-Sensors.

Please take note:

The given measuring precision of 0.01 mm only applies if the original HAIMER probe tips are used.

- IP 67 waterproof

技術資料/Technical details

ゼロマスター アナログ(クランプシャンクφ10mm、ショートプローブφ4mm付き)

Zero Master with clamping shank φ 10 mm including short probe tip φ 4 mm

精度/Accuracy 0,01 mm
寸法(テーパ部含まず)/Length without clamping shank 96 mm

注文番号/Order No. 80.960.00

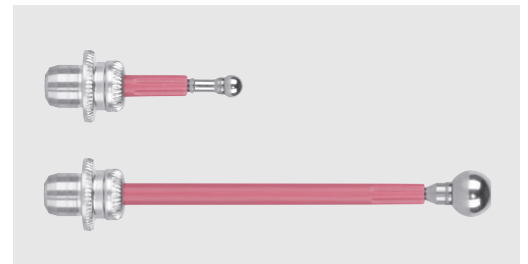
別売りオプション/Accessories

ショートプローブφ4mm/Short probe tip φ 4 mm

注文番号/Order No. 80.362.00

ロングプローブφ8mm/Long probe tip φ 8 mm

注文番号/Order No. 80.363.00

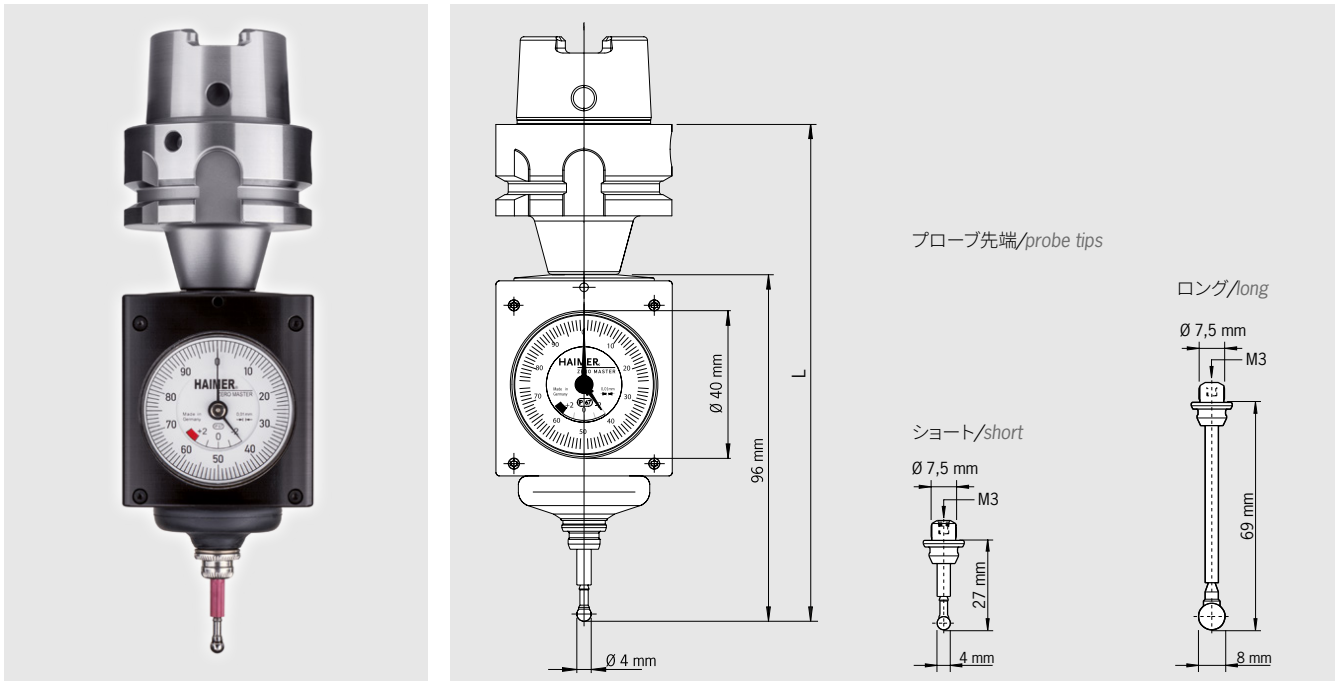


ショートプローブφ4mm/Short probe tip φ 4 mm
ロングプローブφ8mm/Long probe tip φ 8 mm

3Dセンサー ゼロマスター
(各種ツールシャンクー体型タイプ)
3D-Sensor Zero Master
with integrated short adapter



3Dセンサー ゼロマスター(各種ツールシャンク一体型タイプ) 3D-SENSOR ZERO MASTER WITH INTEGRATED SHORT ADAPTER



各種ツールシャンク(SK30, BT30, HSK-25/32/40/50/63)一体型 ゼロマスター

省スペースで簡単に加工物を測定

仕様:

- 各種ツールシャンク(SK30, BT30, HSK-25/32/40/50/63)一体型 ゼロマスター
- 出荷時に振れ精度を調整(0.01mm)している為、再設定必要なし
- 測定精度:0.01mm
- ショート及びロングプローブの交換作業に工具は不要
- 再キャリブレーションは不要
- オーバーラン距離を拡大
- 防水保護等級:IP67

使い方:

- 小型フライス盤、放電加工機用(絶縁プローブ)
- 加工物の測定及び主軸の位置決め
- X,Y,Z軸のすべての方向へ操作可能

For interfaces SK30, BT30, HSK-25/32/40/50/63

Simple workpiece measuring with less space in the machine.

Version:

- With integrated short adapter in version SK30, BT30, HSK-25/32/40/50/63
- No further manual runout adjustment necessary! Delivery with preset runout accuracy at the probe tip of 0.01 mm
- Measuring accuracy: 0.01 mm
- Short and long probe tips available, no tool change necessary
- No re-calibration of the sensor is needed
- Enhanced overrun distance
- IP 67 waterproof

Application:

- For small Milling and EDM machines (isolated probe)
- For workpiece-reset and length measuring
- Any direction approach (X-, Y-, Z-axis)

技術資料/Technical details

ゼロマスター アナログ(各種ツールシャンク一体型タイプ、ショートプローブ \varnothing 4 mm 付き)
3D-Sensor Zero Master with integrated short adapter including short probe tip \varnothing 4 mm

精度/Accuracy	0,01 mm	
商品名/Article	注文番号/Order No.	L [mm]
ゼロマスター HSK-E25一体型タイプ/Zero Master with short adapter HSK-E25	80.963.E25	121,6
ゼロマスター HSK-E32一体型タイプ/Zero Master with short adapter HSK-E32	80.963.E32	131,6
ゼロマスター HSK-E40一体型タイプ/Zero Master with short adapter HSK-E40	80.963.E40	131,6
ゼロマスター HSK-E50一体型タイプ/Zero Master with short adapter HSK-E50	80.963.E50	138,6
ゼロマスター HSK-A32一体型タイプ/Zero Master with short adapter HSK-A32	80.963.A32	131,6
ゼロマスター HSK-A40一体型タイプ/Zero Master with short adapter HSK-A40	80.963.A40	131,6
ゼロマスター HSK-A50一体型タイプ/Zero Master with short adapter HSK-A50	80.963.A50	138,6
ゼロマスター HSK-A63一体型タイプ/Zero Master with short adapter HSK-A63	80.963.A63	142,1
ゼロマスター SK30一体型タイプ/Zero Master with short adapter SK30	80.964.30	131,2
ゼロマスター BT30一体型タイプ/Zero Master with short adapter BT30	80.965.30	130,7

別売りオプション/Accessories

ショートプローブ \varnothing 4mm/Short probe tip \varnothing 4 mm
注文番号/Order No. **80.362.00**



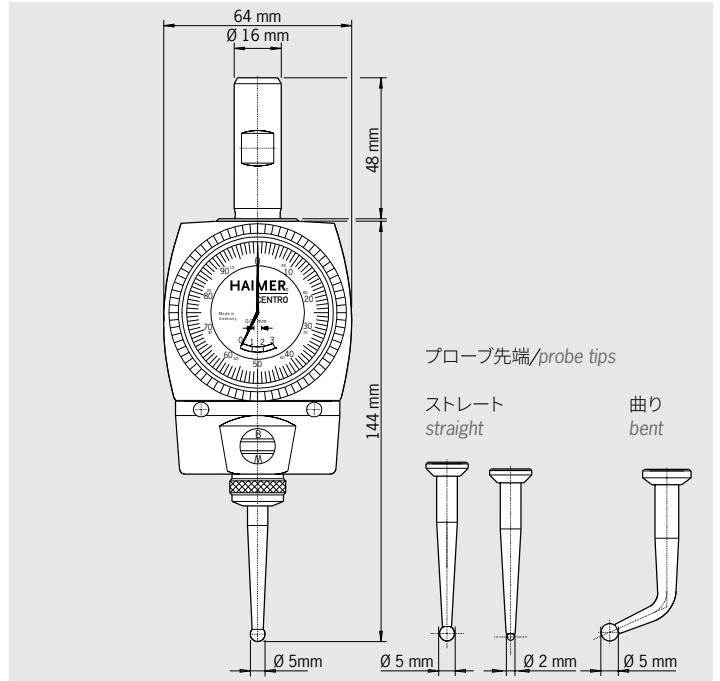
ロングプローブ \varnothing 8mm/Long probe tip \varnothing 8 mm
注文番号/Order No. **80.363.00**



芯出し装置 セントロ Coaxial Indicator Centro



芯出し装置 セントロ CENTRO



セントロ

早く、高精度に、穴内径及びボス外径の芯出し
 フライス盤の主軸に取り付けたセントロのプローブ先端ボールを穴内径またはボス外径に合わせ、ボールが各面に接触しながら芯出しを行います。

ダイヤルゲージは常に正面

プローブ先端は低い主軸回転数で回転しながら加工物表面を滑っていきます。その動きと連動してダイヤルゲージの針が動きます。セントロ本体は主軸と共に回転しません。その為、作業者は常にダイヤルゲージを確認できる状態で作業が行えます。

セントロは軸を確実に検出 - 安全性と確実性

主軸位置と求める軸とが一致しない限り、ダイヤルゲージの針は振れ続けます。針の振れが止まる状態まで主軸位置を移動させると、機械主軸は求める軸に位置したことを意味します。

更なる利点:

- 加工面精度のチェック測定可能
- 主軸とツールホルダーの偏心誤差を補正
 >> 調整作業は不要!
- 大型ダイヤルゲージが操作性と作業性を向上
- 先端プローブの交換可能

Centro

Center bores and arbors quick and precise

The Centro is clamped in a tool holder and positioned close the sought axis. The probe tip is adjusted and touches the bore or arbor all the way around.

Dial gauge always in field of vision

With low rpm the probe slides along the bore or arbor. Its movement is transferred to the dial gauge. By using an antenna the Centro does not spin around and stays in field of vision.

By using the Centro you find the axis of bores or arbors - reliably

As long as the spindle is out of the center of the bore or arbor the hands of the dial gauge stay in movement. By changing the position of x- and y- axis at the machine you can jibe the axis of the spindle and the work piece.

Further advantages:

- Check the axial run-out of the work piece to the spindle
- Compensation of the run-out errors of the spindle and tool holder
 >> No adjustment necessary
- Even in bigger distance the unusual size of the dial gauge is helpful to finish the job
- Replaceable probes

技術資料/Technical details

セントロ (クランプシャック Ø 16mm、ストレートプローブ Ø 5mm 付き)
 Centro with clamping shank Ø 16 mm incl. straight probe tip Ø 5 mm

芯出し精度/Centering accuracy	0,003 mm
最大回転数/Max. rotation speed	150 1/min
測定範囲 内径 Ø (穴)/Measuring range interior diameter (drill hole)	3-125 mm
測定範囲 外径 Ø (シャフト) Measuring range exterior diameter (shaft, with probe tip bent)	0-125 mm
注文番号/Order No.	80.300.00.FHN

別売オプション/Accessories

ストレートプローブ(先端 Ø 5mm)/Probe tip straight with diameter of ball 5 mm 注文番号/Order No.	80.301.00	
湾曲プローブ(先端 Ø 5mm)/Probe tip bent with diameter of ball 5 mm 注文番号/Order No.	80.302.00	
ストレートプローブ(先端 Ø 2mm) ※小径用 Probe tip straight with diameter of ball 2 mm, for small bores 注文番号/Order No.	80.303.00	

推奨する HAIMER 社製 ツールホルダー Recommended HAIMER tool holders

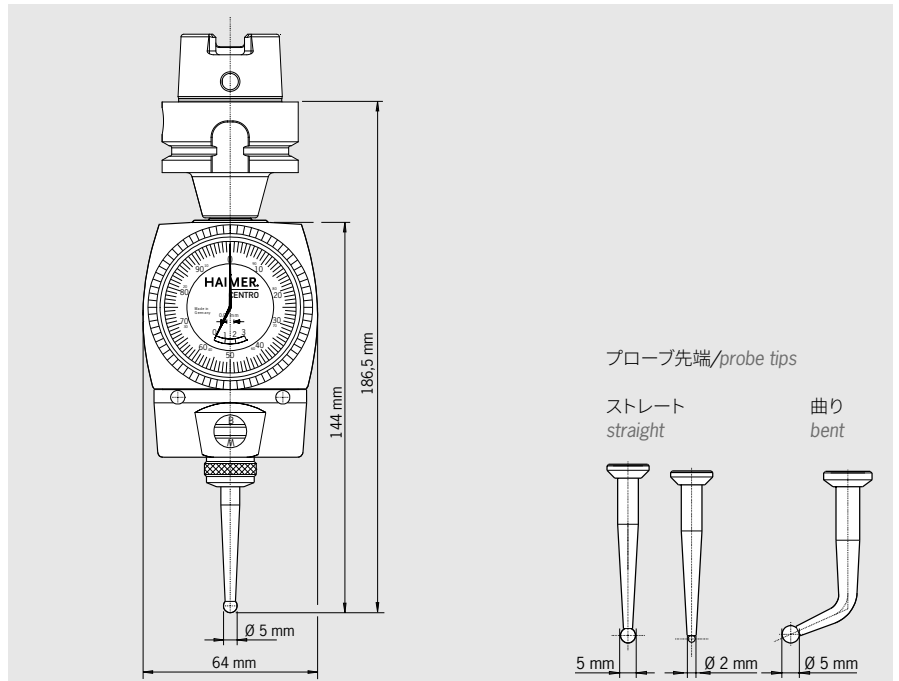
注文番号/Order No.

SK40(短いタイプ)/short chuck SK40	40.300.16
SK50(短いタイプ)/short chuck SK50	50.300.16
BT40(短いタイプ)/short chuck BT40	40.500.16
BT50(短いタイプ)/short chuck BT50	50.500.16
HSK-A40(短いタイプ)/short chuck HSK-A40	A40.000.16
HSK-A50(短いタイプ)/short chuck HSK-A50	A50.000.16
HSK-E50(短いタイプ)/short chuck HSK-E50	E50.000.16
HSK-A63(短いタイプ)/short chuck HSK-A63	A63.000.16
HSK-A100(短いタイプ)/short chuck HSK-A100	A10.000.16

セントロ(ツールシャンク一体型タイプ) Centro with integrated short adapter



セントロ (HSK-A50一体型タイプ) CENTRO WITH INTEGRATED ADAPTER HSK-A50



セントロ(ツールシャンク一体型タイプ)

ツールシャンク一体型タイプは操作性が高く、最高の作業快適性を保証します。

早く、高精度に、穴内径及びボス外径の芯出し

フライス盤の主軸に取り付けたセントロのプローブ先端ボールを穴内径またはボス外径に合わせ、ボールが各面に接触しながら芯出しを行います。

ダイヤルゲージは常に正面

プローブ先端は低い主軸回転数で回転しながら加工物表面を滑っていきます。その動きと連動してダイヤルゲージの針が動きます。セントロ本体は主軸と共に回転しません。その為、作業者は常にダイヤルゲージを確認できる状態で作業が行えます。

セントロは軸を確実に検出 - 安全性と確実性

主軸位置と求める軸とが一致しない限り、ダイヤルゲージの針は振れ続けます。針の振れが止まる状態まで主軸位置を移動させると、機械主軸は求める軸に位置したことを意味します。

更なる利点:

- 加工面精度のチェック測定可能
- 主軸とツールホルダーの偏心誤差を補正
-> 調整作業は不要!
- 大型ダイヤルゲージが操作性と作業性を向上
- 先端プローブの交換可能

Centro with integrated adapter

The integrated adapter guarantees easiest handling and a maximum of comfort.

Center bores and arbors quick and precise

The Centro is clamped in a tool holder and positioned close to the sought axis. The probe tip is adjusted and touches the bore or arbor all the way around.

Dial gauge always in field of vision

With low rpm the probe slides along the bore or arbor. Its movement is transferred to the dial gauge. By using an antenna the Centro does not spin around and stays in field of vision.

By using the Centro you find the axis of bores or arbors - reliably

As long as the spindle is out of the center of the bore or arbor the hands of the dial gauge stay in movement. By changing the position of x- and y- axis at the machine you can jibe the axis of the spindle and the work piece.

Further advantages:




- Check the axial run-out of the work piece to the spindle
- Compensation of the run-out errors of the spindle and tool holder
->> No adjustment necessary
- Even in bigger distance the unusual size of the dial gauge is helpful to finish the job
- Replaceable probes

技術資料/Technical details

セントロ (HSK-A50一体型タイプ、ストレートプローブ \varnothing 5 mm 付き)
Centro with integrated adapter HSK-A50 and straight probe tip \varnothing 5 mm

芯出し精度/Centering accuracy	0,003 mm
最大回転数/Max. rotation speed	150 1/min
測定範囲 内径 \varnothing (穴)/Measuring range interior diameter (drill hole)	3-125 mm
測定範囲 外径 \varnothing (シャフト)	
Measuring range exterior diameter (shaft, with probe tip bent)	0-125 mm
注文番号/Order No.	80.303.A50

別売りオプション/Accessories

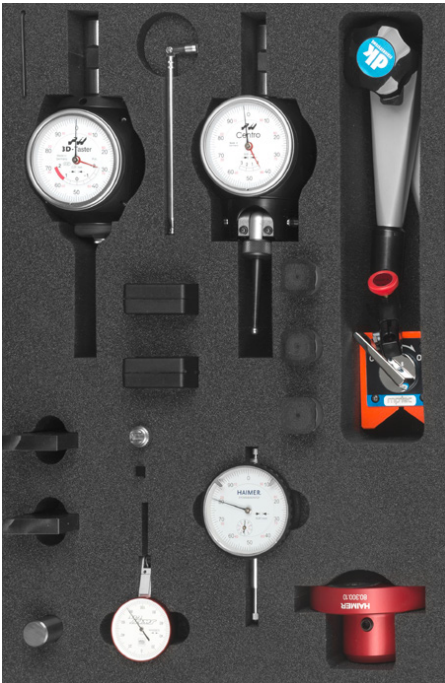
ストレートプローブ(先端 \varnothing 5mm)/Probe tip straight with diameter of ball 5 mm	
注文番号/Order No.	80.301.00
湾曲プローブ(先端 \varnothing 5mm)/Probe tip bent with diameter of ball 5 mm	
注文番号/Order No.	80.302.00
ストレートプローブ(先端 \varnothing 2mm) ※小径用 Probe tip straight with diameter of ball 2 mm, for small bores	
注文番号/Order No.	80.303.00



キャリブレーションセット Machine tool calibration set



キャリブレーションセット MACHINE TOOL CALIBRATION SET



- 防塵・防水性を持ったプラスチックケースは測定機器を保護
- 高精度HAIMER測定装置(3Dセンサー、セントロ)及びアクセサリ
- 測定装置のテストと校正及び測定アプリケーション用ブロックゲージ
- 機械タイプに応じて使用できる測定装置用リダクションアダプター
- マグネットスタンドに高精度のダイヤルゲージ(2個)付属
- Stable, dust proof and water proof plastic-case provides perfect protection of your measuring equipment
- Two high quality, precise and universal HAIMER sensors incl. accessories
- Adapter for versatile use of the HAIMER sensors in all types of metal cutting machines
- Several gauge blocks for checking and calibrating your measuring equipment and for individual measurements
- Two high quality dial indicators with corresponding gauge stand

工作機械を迅速且つ確実に精度確認

- 旋盤やフライス盤を高精度に調整、機械の品質レベルを保障
- 素早い位置決め精度とワークへの正確なアプローチ
- 素早く高精度に軸の原点出しを行い、不良品と予期しない工具コストを回避
- シンプル且つ高い信頼性のジオメトリチェックによる一貫した加工結果を実現

標準付属品:

- スーツケース: 防塵・防水(IP67)・耐衝撃性を持ったプラスチックケース(黒色)
外寸:464 x 366 x 176mm_内寸:426 x 290 x 159mm
- フォームプラスチック内に18箇所の収納場所
- ショートプローブ \varnothing 4mm、ロングプローブ \varnothing 8mm
- HAIMER セントロ
- ストレートプローブ(先端 \varnothing 5mm)
- 湾曲プローブ(先端 \varnothing 5mm)
- ストレートプローブ(先端 \varnothing 2mm)
- セントロ調整用治具
- テストボルト \varnothing 16x93 mm
- KÄFER製ダイヤルゲージ
測定範囲 10mm、耐衝撃性能を持った金属カバー、表示板の回転可
- Tesa製てこ式ダイヤルゲージ „Swisstast“: プローブ長さ12.5mm、ルビーボール付き
- ダイヤルゲージ用マグネットスタンド
可動半径345mm、マグネット吸着力900 N、測定器取付 \varnothing 8h6
- ブロックゲージ 50 x 35 x 9 mm

Fast and easy installation and inspection of your machine tool

- Highly accurate alignment of lathe and milling machines to secure your quality level
- Quick and very precise positioning of your axis and workpieces to check the machine accuracy
- Faster and more precise installation of axis and spindles of your machine tool to reduce scrap and avoid unnecessarily high tool costs
- Simple and reliable inspection of the machine geometry for consistent machining results

Included in delivery:

- Suitcase:
Black plastic-case, dust- and water proof according to IP67, collision protection external dimension: 464x366x176 mm, internal dimension: 426x290x159 mm
- Black foam inlay with 18 recesses
- HAIMER Universal 3D-Sensor
- Short probe tip \varnothing 4 mm, Long probe tip \varnothing 8 mm
- HAIMER Centro
- Straight probe tip, \varnothing 5 mm
- Bent probe tip, \varnothing 5 mm
- Straight probe tip, \varnothing 2 mm
- Centro fixture and adjustment help
- Test bolt, \varnothing 16x93 mm
- KÄFER dialindicator M2TopS:
Measuring range 10 mm, collision protection, robust metal housing, rotation counter
- Lever gauge, TESA Swisstast
Length probe arm 12,5 mm with ruby ball
- Dial indicator tripod, DK fixturing systems
Radius of action 345 mm, magnetic holding power 900 N, clamping shaft \varnothing 8 h 6
- Gauge block, 50 x 35 x 9 mm

TERMS OF DELIVERY AND PAYMENT (MARCH 2022)

I. Generalities

The following conditions apply to all business transactions – also those in the future – with the customer. Our sales and shipping conditions apply exclusively; we do not recognize other conditions as well as especially contrary or otherwise differing conditions on the part of the customer, unless we explicitly approve of the validity of those conditions. Our sales and shipping conditions also apply in the event that we acknowledge contrary or differing conditions on the side of the customer and unreservedly fulfill the order. All agreements reached between ourselves and the customer must be in written form in order to be valid. Our sales and shipping conditions apply exclusively towards registered businessmen/businesswomen if the contract is integrated in operating their business and towards legal entities under public law and separate estates or assets under public law.

II. Prices/Price changes, shipping

1. Our prices offered are Euro prices, and do not include value-added tax. Therefore, value-added tax must be added to the prices at the rate determined by the law applicable at the time. If not agreed specifically otherwise, our prices are ex works, excluding costs for packaging, postage, and shipping. All offered prices are subject to change.
2. Our prices offered are applicable only for the dates of order upon which the offers are based. Subsequent changes or additions upon request or at the instigation of the customer, including additional costs incurred by the above, shall be charged additionally. The same applies for additional costs which might arise as the result of the above from machine down-time. In the event of changes in wages or material costs which arise either between making the offer and the placing of the order, or at any time exceeding four months following completion of contract, we reserve the right to adjust the price accordingly.
3. Shipping of goods occurs at expense and risk of the customer and always plus cost of packaging following to the at any one time valid price list of Haimer or the relevant valid offer. Inasmuch as goods are shipped at cost and risk of the customer at the customer's request, our liability, as far as is legally permissible, is limited to damage caused intentionally or by gross negligence. At the customer's written request, and at his own expense, goods may be shipped insured by ourselves against theft, breakage, damage to or loss of goods in transit, fire and water damage, or against such other risks as may be expressed explicitly by the customer insofar as such are insurable.
4. As far as can be reasonably expected on the part of the customer, partial shipments are permissible.

III. Payment

1. The goods are to be paid in full, no deductions, within 30 calendar days of date of invoice.
2. Bills of exchange are only accepted upon special agreement and on account of performance without allowance for discount. Discounting and bill charges shall be borne by the customer and become due for payment immediately. We are not liable for the timely presentation of a bill of exchange, its due protest, due notice, or the return of an unpaid bill, unless we or our vicarious agents are guilty of damage by intention or gross negligence.
3. The customer is only entitled to set-off claims if his counterclaims have become res judicata, are uncontested or recognized by ourselves. In the event of contested counterclaims, the customer has no right of retention.
4. In the case of uncontested counterclaims, the customer can only claim a right of retention regarding asserted claims which are based upon the same contractual relationship.
5. With respect to this order the customer is obligated to confirm the receipt of the goods in cases of the delivery from Germany to the foreign countries of Europe; the confirmation has to comply with the regulation concerning turnover tax.

IV. Delay in payment

1. In the event of delay in payment, we are entitled to charge the legal rate of interest on overdue payments, i.e. the rate of 9 % plus the basic annual interest rate current at the time in question and a lump sum of 40,00 € per overdue amount; this notwithstanding, we explicitly reserve the right to assert claims regarding additional damages. If the rate of interest is not claimed firstly this shall not exclude a later enforcement in the frames of the legal limitation; in this regard a forfeiture is excluded.
2. Should we become aware of circumstances which call into question the customer's creditworthiness and therefore deem our claim for payment to be at risk, particularly if the initiation of insolvency proceedings are filed for – or if insolvency proceedings are opened against the customer's property, or if a cheque is not honoured, or the customer stops payments respectively is in extensive default of the payment with collection threat, then we are entitled to declare the residual debt due immediately and to demand immediate payment. Further, we are then entitled to demand advance payment or provisions of security, and to retain the goods until payment, advance payment, or provisions of security are made, and to discontinue processing running orders until the same. If a change of the order required by the customer affects the production time, we can claim for a new delivery time adjusted to the new circumstances. Delay of delivery or performance caused by force majeure, caused by circumstances that are beyond our control and caused by incidents which do make the delivery not only temporary difficult or impossible – this is especially strike, lock out, intervention of public administration, act of war, riots, lack of energy, destruction or damage of our production and operating units, which were beyond our control as well as stoppage of transportation means, restrictions of work, etc., even though this occurs at our supplier or their sub-supplier we are not responsible for even if we agreed on binding delivery deadlines. You allow us to prolong the delivery respectively performance time for the time of interference and an additional initial period. Additionally in such cases we have the right to adjust the price. The above mentioned circumstances do also fall beyond our control if they occur during a already existing delay. Begin and end of such interference will be communicated to the customer as soon as possible. The delivery time is observed in case the product left the premise or we communicated the readiness of shipment to the customer at the end of the delivery time.

V. Reservation of title

1. Until all claims arising from the business relationship with the customer are fulfilled, the customer is required to grant the following securities, which we will release at the customer's request and at our own free will if the securities' value consistently exceeds that of the claims by more than 10 %.
2. All goods delivered to the customer remain our property until all claims arising from the business relationship with the customer are paid in full.
3. The object delivered may be neither pledged nor transferred for security to a third party before it is paid in full. In the event of attachment by a third party to the object of delivery, particularly as a pledge, the customer shall refer to our ownership and inform us in writing immediately, so that we can enforce our rights of ownership. The customer is liable for costs which arise judicially or extra-judicially should the third party not be in a position to repay us such costs as arise in relation to the abovementioned.
4. The customer is permitted to sell and process the goods within the context of proper business transactions, as long as he is not in arrears with fulfilling the claims which he owes. We can revoke this permission if the customer is overdue in payments or comes into a state of forfeiture of assets, particularly if insolvency proceedings are opened against his property.
5. The processing or transforming of the goods by the customer shall always be done for us. In the event that the goods are joined, mixed, or blended with other items, we acquire co-ownership in proportion with the value of the goods (sum total of invoice including legal value-added tax) to the remaining items which were joined, mixed, or blended together at the time when they were joined, mixed, or blended together.
For the event that ownership of the goods be lost inasmuch as the goods become an integral or necessary part of another item, the customer hereby concedes to us now, in advance, co-ownership of the main item equal to the share which corresponds with the proportion of the value of the goods delivered (sum total of invoice including legal value-added tax) to the value of the main item at the time of said joining, mixing, or blending.
6. In the event that the goods are sold, the customer now and hereby, for the security of our claims arising from the whole of the business relationship, assigns all claims which arise for the customer from resale or from other legal grounds (insurance, tortious act, or the like) against the buyer or third parties, independently of whether the goods, of which we have (partial) ownership, are resold with or without processing. Upon our request, which may be made at any time, the customer must inform us regarding the state of the claim, and allow us or anyone authorized by us to inspect those business records relevant to the above. We grant the customer permission, subject to revocation, to collect the sums due for the claims we assigned, to his own account and in his own name. This direct debit authorization can only be revoked if the customer does not meet his financial obligations in a proper manner. Our authority to collect ourselves the sums due remains unaffected by the above. However, we bind ourselves not to collect the sums due as long as the customer meets his financial obligations with the collected sales revenue, is not overdue for payments, and especially if no initiation for insolvency proceedings has been filed or cessation of payments has been noted. If this is the case, however, we can require that the customer makes known to us immediately the claims assigned and their debtors, including all information required for collection purposes, providing us with all records necessary therefore, and informing the debtors (third parties) of the assignment of claims. We as well have the right of disclosure of assignments against debtors. The customer, however, is not entitled to assign this claim to third parties.
7. Contrary to position 3, the customer is not entitled to sell the goods, even within the context of proper, standard business transactions, if the customer excludes assigning claims based on the sale of the goods to us.
8. In the event of actions contrary to the terms of contract, particularly in the case of delay of payment, we are entitled to rescission of the contract. Following rescission, we can demand return of the goods from the customer.

VI. Delivery time

1. Delivery dates and delivery periods are only binding if they are confirmed by us explicitly in writing.
2. The confirmed delivery dates and delivery periods start when the following cumulative conditions are met: the clarification of all technical questions; the fulfillment of the customer's contractual obligations, particularly that of furnishing records, authorizations, and release statements. When alterations ordered by the customer have an influence upon the duration of production time, we are entitled to insist upon agreeing to a new delivery time which is adjusted to the changed circumstances. We are not liable for delays in delivery and performance, even if binding dates and times have been agreed upon, in case of acts of God, in case of circumstances which we are not responsible for, and in the event of incidents which not only temporarily substantially impede delivery or make it impossible – this includes in particular strike, lock-out, sovereign intervention, acts of war, riots, electrical shortage, destruction or damage to our production or works fixtures for which we are not liable, as well as transportation failure, work limitations etc., also when the above affect our suppliers or their sub-suppliers. Such circumstances entitle us to postpone delivery or performance for the duration of the impediment plus a reasonable starting-up time. Furthermore, such a case entitles us, for our part, to adjust the price accordingly. We are also not liable for the circumstances mentioned if they arise during an already existing delay. In important cases, we will inform the customer as soon as possible regarding the beginning and end of such hindrances. The delivery deadline is met if by date of its expiry the goods have left the works or the customer has received notice of readiness of dispatch.

VII. Sample

Samples of all kinds, whether designs, models, etc., are prepared especially for the customer according to his instructions and only by prior written commission for the same. In every case, these samples will be billed separately to the customer.

VIII. Storage of documents and items for further use

The storage of the customer's papers and other objects such as may serve some future purpose is undertaken only upon prior written agreement and in exchange for special compensation beyond the date of delivery of the goods ordered. The abovementioned goods a/o objects, if they are placed at our disposal by the customer, shall be handled with care up to the delivery date. In this case as well, storage beyond the delivery date is only granted upon prior written agreement and in return for special compensation. Should the abovementioned documents a/o objects be insured against water, fire, theft, or other dangers, the customer must provide the necessary insurance himself. Further, within legally permissible limits, we are exempt from liability for the loss of, damage to, or destruction of these documents a/o objects.

IX. Company print

On objects of our manufacture, we can, with the customer's permission, make reference to our company in an appropriate manner. The customer can only withhold his permission in the event that he has a justifiable interest in so doing.

X. Time limit for making a claim

Upon delivery, the customer must inspect the goods without delay, and in the event that the goods have obvious defects, these must be reported to us within a period of two weeks following receipt of the goods, in the case of shipping from the point of taking delivery from the shipper or carrier; otherwise, the customer's claims regarding defects are excluded. Claims for non-obvious defects can only be asserted within a period of one year upon receipt of the goods, in the case of shipping upon taking delivery from the shipper or carrier.

XI. Warranty

The warranty period is 1 year after passing of the risk. In the event of defects, we are entitled to choose between rectifying the defects or delivering a substitute, up to the amount of the contractual value, unless we or our vicarious agents are guilty of damage by intent or gross negligence, or if we have given a guarantee for the condition of the goods. If two attempts at rectifying the defects or at delivering a substitute fail, or if rectification or substitution is not possible, not to be reasonably expected for the customer, or finally refused by ourselves, then the customer can demand a reasonable reduction in price or withdraw from the contract. For substantial third-party products, our liability is limited initially to the assignment of liability claims to which we are entitled against the supplier of the third-party products. Any liability ensuing on our part in this instance can only be secondary and requires prior recourse to the courts for the supplier of the third-party product. We will reimburse such costs as may arise if they cannot be collected from the supplier and if they were necessary for prosecution. Guarantee and damage claims which exceed the above are excluded, so far as is permissible by law.

XII. Compensation for Damages

The following liability limits apply for damage claims, within the parameters of the law: For all damages arising from culpable breach of contract, we are liable if we ourselves or our vicarious agents are at fault, but only in case of damage by intention or gross negligence. Within the limits of the law, this also applies in cases of default or when performance becomes impossible. Insofar as we are considered liable for damages due to breach of contract which results from a slight degree of negligence on our part or on the part of our vicarious agents, liability for indirect damages is excluded. When delay damages arise due to delay in our performance, we are only liable to the extent of contractual value (our own work excluding advance performance and material) if we or our vicarious agents are only at fault for slight negligence. This limitation of liability also applies for damages in connection with services of Haimer for goods of customers (e.g. Balancing, Cool Jet, Cool-Flash, Duo-Lock or Safe-Lock), whereupon the liability is limited to the extent of the contractual value of the service by Haimer.

XIII. Taking Delivery; Passing of Risk

The customer must take delivery of the goods at the completion time agreed upon if the goods are ready for acceptance. If the customer is in default of acceptance, regardless of article III.1 the price agreed upon is due immediately. If the customer does not meet this obligation, we are entitled to withdraw from the contract and to make other use of the goods, whereby the sales revenues gained in this case are credited to the price agreed upon. We must be compensated for profit lost. If the seller is in default of acceptance or fails to perform other participation duties, then we are entitled to demand compensation for damages thus caused, including any additional expenditures which may arise. We reserve the right to further claims on our behalf. In case of default or delay in acceptance by the buyer, or other failure to perform participation duties on the part of the buyer, then the risk of accidental loss of the goods or of accidental worsening of the state of the goods passes over to the buyer from the point in which he entered into the state of default in acceptance or debtor's delay.

XIV. Ownership, Copyright, Duty of Secrecy

Those articles of the trade which we use to manufacture the product of the contract, in particular special means of operation (tools, devices) remain our property and shall not be delivered. We reserve for ourselves the ownership and copyrights of estimates of cost, drawings, and other documents. They may only then be made available to unauthorized third parties if we give our prior explicit written permission. The customer is solely liable if, in the process of executing orders, any rights, particularly copyrights, trademarks, or patents of third parties are infringed upon. The customer indemnifies us against claims of third parties in the event of such violations of rights. All ideas and documents drawn up by ourselves, in particular samples, sketches, designs, technical information, models, technical drawings etc. are under the protection of our intellectual property, have to be treated confidential and may not be used or applied in any manner without our prior written consent.

XV. Export

The customer (Buyer) confirms if he resales Haimer products that he complies with all provisions and regulations of German and international export controls as well as with the US re-export regulations. The customer (Buyer) declares with his order his compliance with this kind of laws and regulations. Additionally the customer (Buyer) confirms with his order that the products will remain in the delivery country respectively will not be delivery out of the European Union.

XVI. Sustainability Guidelines

1. Our company is committed to sustainability guidelines and expects a similar commitment and application from all business partners. Our sustainability guidelines can be accessed via the following

link: https://www.haimer.de/fileadmin/assets/unternehmen/Soziales_Engagement/22_03_CodeOfConduct_210x297_EN.pdf

2. We reserve the right to review this at our business partners after consultation as part of quality audits.

XVI. Applicability of German Law

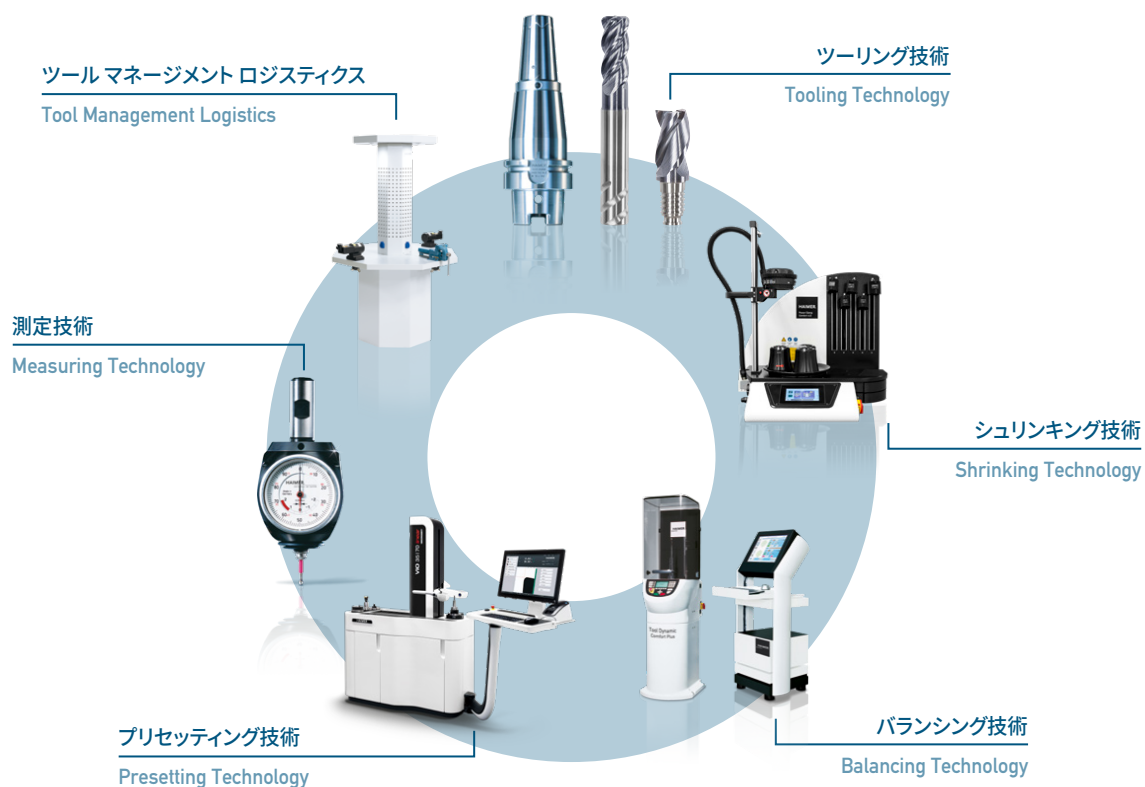
The law of the Federal Republic of Germany is exclusively applicable. Application of the UN Convention on Contracts for the International Sale of Goods, dated January 1, 1991, is precluded.

XVII. Place of Performance, Place of Jurisdiction, and Validity

The place of performance for all claims arising from this contractual relationship is place of business of the seller. The place of business of the seller is also the place of jurisdiction for all legal disputes arising from this business connection. We are, however, entitled to bring grievances before the legal place of jurisdiction as well. The partial or complete invalidity of any provision in these terms of sales and delivery, or of any provision within the context of other agreements, whether now or in the future, shall not affect the validity of any part of the remaining provisions or agreements. The invalid provision is then replaced by that lawfully permissible provision which is closest to the meaning of the invalid provision.

HAIMER®

Quality Wins.



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