

# CANNULATED COMPRESSION SCREWS

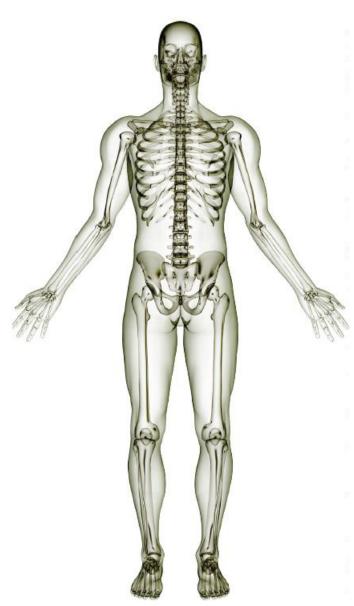
# Surgical Technique



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Austofix is a leading manufacturer and designer of orthopaedic trauma medical devices with a particular focus on innovation, excellence and patient safety. Austofix has the expertise and experience in developing a new device from concept to a fully Commercialised product with regulatory approval for world-wide distribution.

Throughout its 25+ years Austofix has gathered a team of world-class research and development specialists. Together with orthopaedic surgeons, our specialists identify emerging techniques and innovations in the field of orthopaedic trauma and develop world-class solutions.

Austofix is now one of Australia's key contributors to the world-wide medical technology industry. By focusing on specific market needs we can leverage our staff expertise to develop effective solutions and successfully compete on the world stage.

We understand that accidents don't wait to happen, so we ensure that our equipment and devices are ready when needed. With a dedicated 24 hour, seven day a week customer service and sales team, Austofix products are ready when you are.

With our focus on trauma we understand the specific needs of trauma surgeons. Our product specialists actively support the surgeon by being on call to support procedures and offer advice.

Austofix products and innovations assist the surgeon in performing accurate, efficient and safe procedures that result in better health outcomes for the patient.

The measurement of our success is seen through our excellent clinical results and positive surgeon feedback. We understand the need for efficiency during operations and that this is key in improving patient outcomes. Our products and tools are designed to minimise time spent in theatre. Furthermore, all clinical feedback of our products is promptly addressed to ensure product refinements reflect all surgical concerns.

For further information, updates and contact details visit austofix.com.au and follow us on LinkedIn.

#### Disclaimer

This document is intended to be read by experienced orthopaedic surgeons familiar with Cannulated Compression Screws.

This document is intended as the recommended procedure for using the Cannulated Compression Screw. It offers guidance only. Each surgeon should consider the particular needs of the patient and make appropriate adjustments where necessary.

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# CANNULATED COMPRESSION SCREWS

The Austofix Cannulated Compression Screw system provides surgeons with a complete fixation and fracture reduction system for the many complex fracture patterns found in various small and large bones.

Implant grade Titanium Screws incorporate significant benefits: lightweight, high strength and biocompatible.

3.0mm, 4.5mm, 6.5mm and 7.3mm Screw lengths with varying thread length options provide flexibility in fixation and fracture nonunion solutions.

Austofix understands the importance of proven, high quality medical devices and instruments. The Cannulated Compression Screw system adheres to these principles and will provide the surgeon with comprehensive fracture fixation.



### Screw Range

This Surgical Technique applies to the following Cannulated Compression Screws. Each screw is available in a variety of lengths and configurations (see implant listings on page 10).

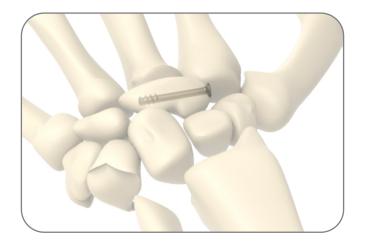
Screw selection is determined by the surgeon.

#### 3.0mm Cannulated Screw

Designed to be used for fracture fixation within the forearm, hand and foot:

- Carpus
- Metacarpus
- **Distal Radius**
- Radial Head
- Radius & Ulna Styloid Process
- Metatarsus

Can be utilised for arthrodeses of the Carpal and Metacarpal bones



#### 4.5mm Cannulated Screw

Designed to be used for medium fracture fixation:

- Lateral & Medial Malleolus
- Acetabulum
- Pelvis
- Distal Tibia
- Calcaneus
- Talus
- Patella
- Tibial Plateau
- Distal tibial pilon fracture fixation

Can be utilised for arthrodeses of the Carpal and Tarsal bones as well as ligament fixation



#### 6.5mm & 7.3mm Cannulated Screws

Designed to be used for large fracture fixation:

- Femoral Neck
- Intercondylar Femoral fractures
- Tibial Plateau

6.5mm and 7.3mm Screws also provide solutions

- Femoral Head epiphysiolysis
- Ankle arthrodeses
- Iliosacral dislocations



#### Screw Features

#### Screw Design

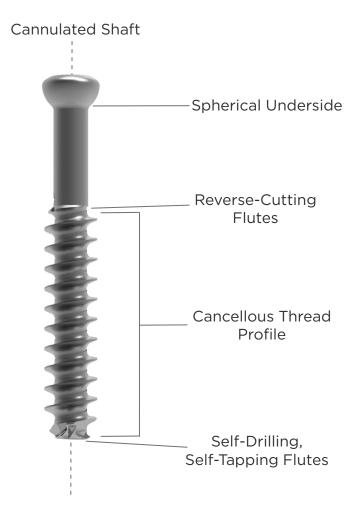
- » Cannulated shaft allows percutaneous insertion with the use of K-Wires
- » Low-profile head reduces irritation of soft tissue
- » Reverse-cutting flutes help with screw removal
- » Cancellous thread profile uses deep cutting threads with a large pitch to reduce probability of backout
- » Large thread pitch assists with screw insertion and removal
- » Self-drilling, self-tapping flutes reduce the need for pre-drilling and pre-tapping

#### Additional Features

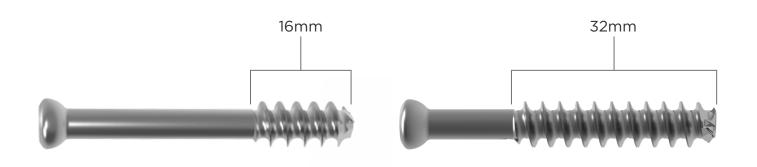
- » Various thread lengths allows optimal fit to far bone fragment, for interfragmentary compression
- » Washer available to prevent screw head from sinking into osteopenic bone

#### Ø6.5/Ø7.3mm Compression Screws

» 16mm and 32mm thread options allow optimal interfragmentary compression for large bones such as the Femur







## Pre-Drilling

Use the table below for reference regarding required instrumentation for Cannulated Compression Screw insertion. Follow the steps in the surgical technique found on pages 8 to 11 to insert  $\emptyset 3.0$ ,  $\emptyset 4.5$ ,  $\emptyset 6.5$  or  $\emptyset 7.3$ mm Cannulated Compression Screws correctly.

	Screw Diameter			
	Ø3.0mm	Ø4.5mm	Ø6.5mm Ø7.3mm	
Instrument Set	Full Cann 3.0 Instrument Set (SET-INS-CAN3.0)	Full Cann 4.5 Instrument Set (SET-INS-CAN4.5)	Full Cann 6.5/7.3 Instrument Set (SET-INS-CAN6.5/7.3)	
K-Wire	Ø1.1mm (114500001/2)	Ø1.6mm (114200003)	Ø2.5mm (114400003)	
Drill Guide	1.1/2.0mm (114500003)	4.5/3.2mm (113100013)	-	
Percutaneous Drill Sleeve Assembly	-	3.2/1.6mm Drill Bushing (114200010) 7.0/3.2mm Drill Bushing (114200009) 9.5/7.0mm Locator (114200008) 1.6 Trocar (114200011)	12/8.5mm Protective Sleeve (114400010) 8.2/2.5mm Drill Bushing (114400009) 1.6mm Trocar (114400008)	
Parallel Insertion	-	Parallel Locator 1.6mm (114200005)	Parallel Locator (114400005) Ø2.5mm Adjustable/Parallel (114400014)	
Drill	DPHH		Ø5.0mm (114400004)	
T-Handle	Quick Coupling, Cannulated (114500004)	Quick Coupling, 90mm (112100024)	-	
Depth Gauge	For Ø3.0mm Screw (114500005)	For Ø4.5mm Screw (114200001)	For Ø6.5/7.3mm Screws (114400001)	
Driver	Ø2.0mm Phillips, Cannulated (114500008)	Ø3.5mm Hex, Cannulated (114110015)	Ø4.0mm Hex, Cannulated (114400006)	
Countersink	For Ø3.0mm Screw (114500007)	For Ø4.5mm Screw (114200004)	For Ø6.5/7.3mm Screws (114400012)	
Compatible Washer	Ø3.0mm (1182-00-03000)	Ø4.0mm (1182-00-04000) Ø4.5mm (1182-00-04500)	Ø6.5/7.3mm (1182-00-06500)	

### Surgical Technique

#### 3.0 Cannulated Screw Insertion

#### Required Instruments:

<b>Product Code</b>	Description
114500001	K-Wire 1.1mm
114500002	K-Wire with Threaded Tip 1.1mm
114500003	Drill Sleeve 1.1/2.0mm
114500004	T-Handle with Quick Coupling, Cannulated
114500006	Drill Bit, Cannulated 2.0mm
114500007	Countersink 4.0 x 120mm
114500005	Depth Gauge
114500008	Screwdriver, Cannulated 120mm (Phillips)
114500011	Screw Holder

1. Position the 1.1mm portion of the 1.1/2.0mm Drill Sleeve (114500003) against the bone and insert the 1.1mm Threaded K-wire (114500002) to the desire depth.

**Note:** The Non-Threaded K-wire (114500001) can be used if the surgeon prefers.

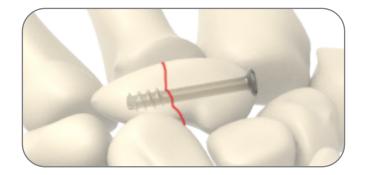
2. Attach the 2.0mm Cannulated Drill Bit (114500006) to the Cannulated T-handle with Quick Coupling (114500004). Place this assembly over the 1.1mm K-wire and manually pre-drill the desired length

**Note:** The self-drilling flutes of the 3.0mm Cannulated Screws make pre-drilling unnecessary in most cases. However, pre-drilling may still be required, especially in dense bone.

3. Where the bone is surrounded by only a thin layer of soft tissue, use the Cannulated Countersink (11450007) to create a recess for the screw head. Countersinking will also facilitate screw insertion.

4. Remove the 1.1/2.0mm Drill Sleeve, place the Depth Gauge (114500005) over the 1.1mm Threaded K-wire against the bone surface. Read the appropriate screw length directly from the depth gauge. e.g. If the reading indicates 20mm, choose a 20mm cannulated screw.

**Note:** To achieve greater inter-fragmentary compression, the threaded part of the desired cannulated screw should pass the fracture line.



5. Insert the desired Cannulated Screw over the 1.1mm Threaded K-wire assembly. Using the 2.0mm Cannulated Phillips Screwdriver (114500008) and Cannulated T-Handle with Quick Coupling, secure the screw. Once the Screw is inserted securely, remove the 1.1 mm Threaded K-wire and screwdriver.

Note: In osteopenic bone, a 3.0mm washer may be used to prevent the screw head from sinking into the bone.

#### 4.5 Cannulated Screw Insertion

#### Required Instruments:

<b>Product Code</b>	Description
114200003	K-Wire 1.6 x 150mm
114200008	Locator 7.0/9.5 x 39mm
114200009	Drill Bushing 3.2/7.0 x 46mm
114200010	Drill Bushing 1.6/3.2 x 52mm
114200011	Trocar 1.6 x 58.8mm
114200006	Screwdriver 3.5 x 220mm (Hex)
114200007	Holding Sleeve 6.5 x 89mm
112100024	T-Handle with Quick Coupling, 90mm
114110015	Screwdriver with Quick Coupling 3.5 x 100mm (Hex)
114200005	Parallel Locator 1.6mm
114200012	Drill Bit 3.2mm, Cannulated 170mm
114200004	Countersink Drill Bit 160mm
114200001	Depth Gauge 150/230mm

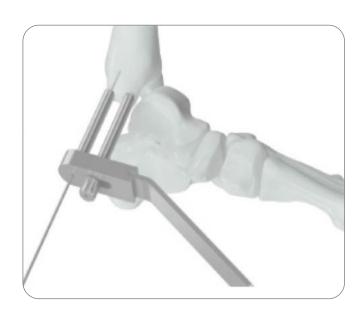
Insertion of the 4.5 Cannulated Screw follows the same basic operative procedure as the 3.0 Cannulated Screw. The difference being to insert the 1.6mm Threaded K-wire to the desired depth through the Sleeve Assembly.

The Sleeve Assembly is made by combining the following:

- 3.2/1.6mm Drill Bushing (114200010)
- 7.0/3.2mm Drill Bushing (114200009)
- 9.5/7.0mm Locator (114200008)
- Once the first K-wire is inserted, remove the Sleeve Assembly from the wire.
  Place the fixed portion of the Parallel Locator (114200005) over the first placed K-wire.
- 2. Move the adjustable sleeve to the desired position and tighten the nut. Insert the second threaded K-wire following the same operative procedure as the first.
- 3. Remove the Parallel Locator and repeat steps 2-3 for any additional K-wires.

**Note:** It is recommended that the lateral cortex be pre-drilled using the 1.6mm Drill Bit for the second and any other additional K-wires.

Drilling and Insertion of the 4.5mm Cannulated Screw follows the same procedure as the Insertion of the 3.0mm Cannulated Screw.



#### 6.5/7.3 Cannulated Screw Insertion

#### Required Instruments:

<b>Product Code</b>	Description
114400003	K-Wire 2.5 x 300mm
114400009	Drill Bushing 8.5/2.5 x 118mm
114400010	Protective Sleeve 12/8.5 x 108mm
114400008	Trocar 2.5 x 128mm
114400006	Screwdriver, Cannulated 4.0 x 248mm (Hex)
114400007	Holding Sleeve 8.0mm
114400011	Screwdriver, Solid 4.0 x 248mm (Hex)
114400005	Parallel Locator
114400004	Drill Bit, Cannulated 5.0 x 300mm
114400012	Countersink Drill, Tubular 8.0 x 230mm
114400001	Depth Gauge 330mm
114400014	Drill Guide, Adjustable Parallel 2.5mm

Insertion of the 6.5/7.3 Cannulated Screws follow the same procedure as the 4.5mm Cannulated Screw.

The Sleeve Assembly is made by combining the following:

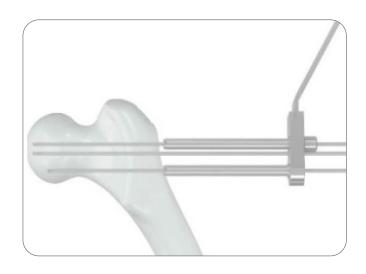
- 12/8.5mm Protective Sleeve (114400010)
- 8.2/2.5mm Drill Bushing (114400009)
- 1.6mm Trocar (114400008)

For the insertion of parallel screws there are two options:

#### **Option 1:** Parallel Locator

- 1. Once the first K-wire is inserted, remove the Sleeve Assembly from the wire. Place the fixed portion of the Parallel Locator (114400005) over the first placed K-wire.
- 2. Move the adjustable sleeve to the desired position and tighten the nut. Insert the second threaded K-wire following the same operative procedure as the first.
- 3. Remove the Parallel Locator and repeat steps 2-3 for any additional K-wires.

Note: It is recommended that the lateral cortex be pre-drilled using the 2.5mm Drill Bit for the second and any other additional K-wires.



#### Option 2: Parallel Drill Guide

- 1. Place the Parallel Drill Guide (114400014) in the desired position.
- 2. Select a hole pattern and insert the 2.5mm Threaded K-wires through the desired holes.
- 3. Once all of the desired K-wires are placed, remove the Parallel Drill Guide.

Determining the required screw length and the insertion of the 6.5/7.3mm Cannulated Screws follows the same procedure as the 4.5mm Cannulated Screws.



#### Implant Removal

Make a small incision in the old scar to expose the screw head and remove the Cannulated Screw using the appropriate Screwdriver and T-handle with Quick Coupling (if necessary).

	Screw Diameter			
	Ø3.0mm	Ø4.5mm	Ø6.5mm	Ø7.3mm
T-Handle	Quick Coupling, Cannulated (114500004)	-		-
Driver	Ø2.0mm Phillips, Solid (114500009)	Ø3.5mm Hex, Solid (114200006)	Ø4.0 Hex, (11440	

## Ø3.0mm

# Implants

3.0mm Cannulated Compression Screws			
Product Code	Length	Thread Length	
1019-01-30012	12	4	
1019-01-30013	13	4	
1019-01-30014	14	4	
1019-01-30015	15	4	
1019-01-30016	16	4	
1019-01-30017	17	4	
1019-01-30018	18	4	
1019-01-30019	19	4	
1019-01-30020	20	5	
1019-01-30021	21	5	
1019-01-30022	22	6	
1019-01-30023	23	6	
1019-01-30024	24	6	
1019-01-30025	25	7	
1019-01-30026	26	7	
1019-01-30027	27	7	
1019-01-30028	28	7	
1019-01-30029	29	7	
1019-01-30030	30	7	



Cannulated Screw Washer		
Product Code	Diameter	
1182-00-03000	3.0	



## Instruments



	Instruments			
#	Code	Description	Qty	
1	114500010	Cleaning Wire 1.1 x 220mm	1	
2a.	114500001	K-Wire 1.1mm	4	
2b.	114500002	K-Wire with Threaded Tip 1.1mm	4	
3	114500004	T-Handle with Quick Coupling, Cannulated	1	
4	114500005	Depth Gauge	1	
5	114500006	Drill Bit, Cannulated 2.0mm	2	
6	114500008	Screwdriver, Cannulated 120mm (Phillips)	1	
7	114500007	Countersink 4.0 x 120mm	1	
8	112300003	Drill Bit 2.0 x 100mm	1	
9	114500009	Screwdriver, Solid 100mm (Phillips)	1	
10	114500003	Drill Sleeve 1.1/2.0mm	1	
11	114500011	Screw Holder	1	

Instrument Tray		
Code	Description	Qty
114502000	Cann 3.0 Instrument Tray (Empty)	1

Instrument Set			
Code	Description	Qty	
SET-INS-CAN3.0	Full Cann 3.0 Instrument Set	-	

# **Ø4.5mm**

# Implants

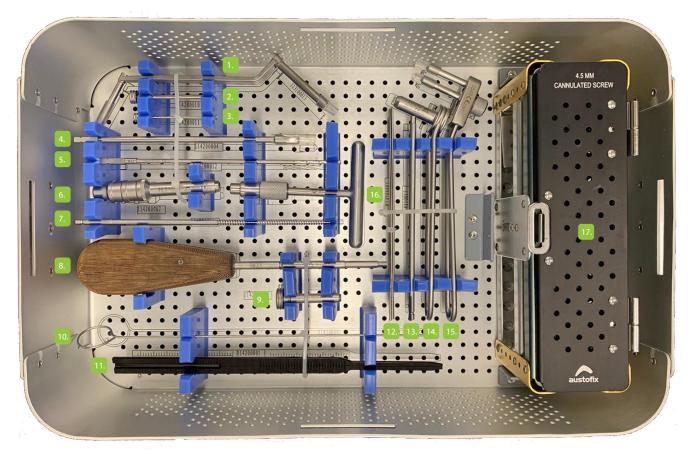
4.5mm Cannulated Compression Screws			
Product Code	Length	Thread Length	
1019-01-45020	20	7	
1019-01-45022	22	7	
1019-01-45024	24	8	
1019-01-45026	26	9	
1019-01-45028	28	9	
1019-01-45030	30	10	
1019-01-45032	32	11	
1019-01-45034	34	11	
1019-01-45036	36	12	
1019-01-45038	38	13	
1019-01-45040	40	13	
1019-01-45042	42	14	
1019-01-45044	44	15	
1019-01-45046	46	15	
1019-01-45048	48	16	
1019-01-45050	50	17	
1019-01-45052	52	17	
1019-01-45054	54	18	
1019-01-45056	56	19	
1019-01-45060	60	20	
1019-01-45064	64	21	
1019-01-45068	68	23	



Cannulated Screw Washer				
Product Code Diameter				
1182-00-04000	4.0			
1182-00-04500	4.5			



## Instruments



	Instruments						
#	Code	Description	Qty	#	Code	Description	Qty
1	113100013	Drill Guide 3.2/4.5mm, Universal	1	10	114200002	Cleaning Wire 1.6 x 240mm	1
2	114200010	Drill Bushing 1.6/3.2 x 52mm	1	11	114200001	Depth Gauge 150/230mm	1
3	114200011	Trocar 1.6 x 58.8mm	1	12	114200003	K-Wire 1.6 x 150mm	10
4	114200004	Countersink Drill Bit 160mm	1	13	114110015	Screwdriver with Quick Coupling 3.5 x 100mm (Hex)	1
5	114200012	Drill Bit 3.2mm, Cannulated	1			` '	,
J	3 114200012 170m	170mm	'	14	114200008	Locator 7.0/9.5 x 39mm	
6	114200007	Holding Sleeve 6.5 x 89mm	1	15	114200005	Parallel Locator 1.6mm	1
7	114200014	Tap for 4.5 Cancellous Screw, Cannulated 180mm	1	16	112100024	T-Handle with Quick Coupling, 90mm	1
8	114200006	Screwdriver 3.5 x 220mm (Hex)	1	17	114202000	Cann 4.5 Screw Tray	1
9	114200009	Drill Bushing 3.2/7.0 x 46mm	1				

Instrument Tray			
Code	Description	Qty in Set	
114204000	Cann 4.5 Instrument Tray (Empty)	1	

Instrument Set			
Code	Description	Qty in Set	
SET-INS-CAN4.5	Full Cann 4.5 Instrument Set	-	

# Ø6.5 & 7.3mm

# Implants

6.5mm Cannulated Compression Screws					
16mm Thread	32mm Thread	Length			
1019-01-65040	1148-00-65040	40			
1019-01-65045	1148-00-65045	45			
1019-01-65050	1148-00-65050	50			
1019-01-65055	1148-00-65055	55			
1019-01-65060	1148-00-65060	60			
1019-01-65065	1148-00-65065	65			
1019-01-65070	1148-00-65070	70			
1019-01-65075	1148-00-65075	75			
1019-01-65080	1148-00-65080	80			
1019-01-65085	1148-00-65085	85			
1019-01-65090	1148-00-65090	90			
1019-01-65095	1148-00-65095	95			
1019-01-65100	1148-00-65100	100			
1019-01-65105	1148-00-65105	105			

7.3mm Canı	nulated Compres	ssion Screws
16mm Thread	32mm Thread	Length
1019-00-75040	1148-00-73040	40
1019-00-75045	1148-00-73045	45
1019-00-75050	1148-00-73050	50
1019-00-75055	1148-00-73055	55
1019-00-75060	1148-00-73060	60
1019-00-75065	1148-00-73065	65
1019-00-75070	1148-00-73070	70
1019-00-75075	1148-00-73075	75
1019-00-75080	1148-00-73080	80
1019-00-75085	1148-00-73085	85
1019-00-75090	1148-00-73090	90
1019-00-75095	1148-00-73095	95
1019-00-75100	1148-00-73100	100
1019-00-75105	1148-00-73105	105
1019-00-75110	1148-00-73110	110
1019-00-75115	1148-00-73115	115
1019-00-75120	1148-00-73120	120
1019-00-75125	1148-00-73125	125
1019-00-75130	1148-00-73130	130

Cannulated S	Screw Washer
Product Code	Diameter
1182-00-06500	6.5/7.3





## Instruments



		Instruments	
#	Code	Description	Qty
1	114400005	Parallel Locator	1
2	114400001	Depth Gauge 330mm	1
3	114400012	Countersink Drill, Tubular 8.0 x 230mm	1
4	114400006	Screwdriver, Cannulated 4.0 x 248mm (Hex)	1
5	114400004	Drill Bit, Cannulated 5.0 x 300mm	1
6	114400002	Cleaning Wire 2.5 x 330mm	1
7	114400010	Protective Sleeve 12/8.5 x 108mm	1
8	114400009	Drill Bushing 8.5/2.5 x 118mm	1
9	114400008	Trocar 2.5 x 128mm	1
10	114400011	Screwdriver, Solid 4.0 x 248mm (Hex)	1
11	114400014	Drill Guide, Adjustable Parallel 2.5mm	1
12	114400003	K-Wire 2.5 x 300mm	10
13	114400015	Tap for Cancellous Bone Tubular Screw, 280mm	1
14	114400007	Holding Sleeve 8.0mm	1

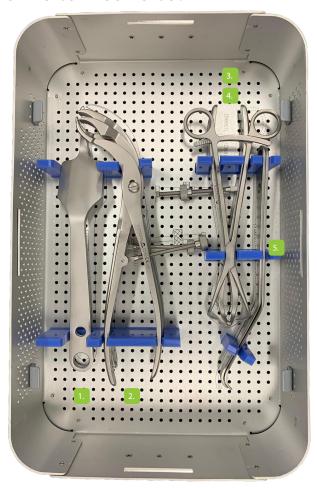
Instrument Set		
Code	Description	Qty.
SET-INS-CAN6.5/7.3	Full Cann 6.5/7.3 Instrument Set	-

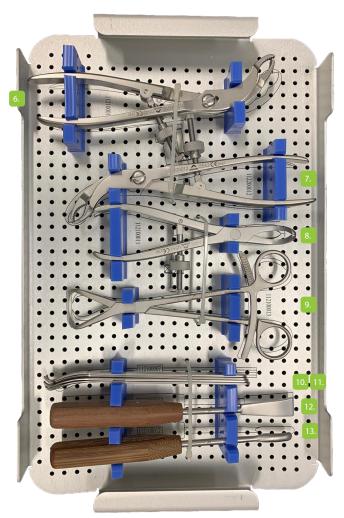
	Instrument Tray	
Code	Description	Qty.
114404000	Cann 6.5/7.3 Instrument Tray (Empty)	1

Screw Tray				
Code	Description	Qty.		
114402000	Screw Tray 6.5	1		
114403000	Screw Tray 7.3	1		

## Optional Sets

## Universal Trauma Set





		Instruments	
#	Code	Description	Qty
1	113100017	Hohmann Retractor (Large) 43.5 x 267mm	2
2	113100019	Self-Centering Bone Holding Forceps (Speed Lock) 266mm	1
3	113100021	Reduction Forceps (Serrated Jaws) 220mm	2
4	113100022	Reduction Forceps (Point) 207mm	1
5.	113100018	Hohmann Retractor (Small) 16 x 267mm	1
6	112100010	Self-Centering Bone Holding Forceps (Speed Lock) 191.8mm	2
7	112200012	Self-Centering Bone Holding Forceps (Compression)	1
8	112100011	Reduction Forceps (Serrated Jaws) 158mm	1
9	112100013	Reduction Forceps (Points) 182mm	1
10	112100006	Hohmann Retractor (Large) 15.5 x 159mm	2
11	112100007	Hohmann Retractor (Small) 10.5 x 170mm	2
12	113100016	Periosteal Elevator (Large)191mm	1
13	112100012	Periosteal Elevator (Small) 190mm	1

Instrument Set		Instrument Tray	
Code	Description	Code	Description
SET-INS-UTRA	Full Universal Trauma Instrument Set	1132122000	Universal Trauma Instrument Tray (Empty)

# Single Use Items

K-Wires				
Code	Description	Qty		
114500001	K-Wire 1.1 x 150mm	2		
114200003	K-Wire 1.6 x 150mm	2		
114400003	K-Wire 2.5 x 300mm	2		

Drills				
Code	Description	Qty		
112300003	Drill Bit 2.0 x 100mm	1		
114500006	Drill Bit, Cannulated 2.0mm	1		
114200012	Drill Bit 3.2mm, Cannulated 170mm	1		
114400004	Drill Bit, Cannulated 5.0 x 300mm	1		



### MRI Safety

Austofix has not evaluated its devices for safety and compatibility in a Magnetic Resonance (MR) environment. However, the materials used in their manufacture are known to have minimal ferromagnetism, with minimal risk to patients in strong magnetic fields.

Austofix has performed a review of published, peer-reviewed data, which confirms that only minor rises in MRI-related heating are observed from devices manufactured from the same titanium and stainless-steel materials. Trauma devices are considered unlikely to produce injury to patients, including in the worst-case 3.0T systems.

The devices and materials observed in the literature experience forces too weak to cause significant displacement; the risk being further mitigated by their implantation in bone. Risks of imaging artifacts are known to MRI operators, and can be reduced by choosing appropriate pulse sequences and optimizing scanning parameters by using a large bandwidth, small field-of-view and appropriate echo train length.

Average temperature changes have been observed in studies at 0.48°C in titanium and 0.74°C in stainless-steel. Rises in temperature in clinical situations may depend on individual patient factors. It should be recommended that patients be thoroughly monitored when undergoing MR scanning, and that impaired patient thermoregulation be considered a contraindication for MRI procedures.

#### Sources:

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Shellock FG. Biomedical Implants and Devices: Assessment of Magnetic Field Interactions With a 3. O-Tesla MR System. 2002, 721-732.

Zou Y, Chu B, Wang C, Hu Z. Evaluation of MR issues for the latest standard brands of orthopedic metal implants, Plates and screws. Eur J Radiol. 2015, 84(3):450-457.

## Notes

## Notes



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