



# TRANS-AUTO OY



## Manuaalinen Ohjausjärjestelmän Valinta

Veneen Pituus (metri)	Liukuvarunkoinen Vene				Uppoumarunkoinen Vene			
	1 Moottoria		2 Moottoria		1 Moottoria		2 Moottoria	
	Huvivene	Työvene	Huvivene	Työvene	Huvivene	Työvene	Huvivene	Työvene
0 – 8	<u>1</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>2</u>
8 - 9,8	<u>1</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>2</u>	<u>3</u>	<u>2</u>	<u>3</u>
9,8 - 11,6	<u>2</u>	<u>3</u>	<u>2</u>	<u>3</u>	<u>3</u>	<u>4</u>	<u>2</u>	<u>3</u>
11,6 - 13	<u>3</u>	<u>4</u>	<u>2</u>	<u>4</u>	<u>4</u>	<u>6</u>	<u>3</u>	<u>5</u>
13,4 - 15,3	<u>7</u>	<u>7</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>5</u>	<u>6</u>
15,5 - 16,8	<u>8</u>	<u>9</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>7</u>	<u>8</u>
16,8 - 18	<u>8</u>	<u>9</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>
18 – 19,8	Pyydä lisätietoa		<u>8</u>	Pyydä lisätietoa	<u>8</u>	<u>9</u>	<u>8</u>	<u>9</u>
19,8 - 21			<u>8</u>		<u>9</u>	<u>9</u>	<u>10</u>	
21 - 22,8			<u>9</u>		<u>10</u>	<u>11</u>	<u>10</u>	<u>11</u>
22,8 - 24,3			<u>9</u>		<u>10</u>	<u>11</u>	<u>10</u>	<u>11</u>
24,3 -	Pyydä lisätietoa							

\*Ylä-olevat järjestelmät ovat vain neuvonantavia. Järjestelmän oikealainen mitoitusta kuuluu tehdä tarvittavan maksimiväännön mukaan.

\*\* Uppoumarunkoinen Veneen nopeus yleisesti ei ylitä 18 solmua. Liukuvarunkoinen Veneen suositukset ovat tehty alle 30 solmun nopeuksiin.

ALUMINUM CYLINDER			
Components	Model	Code	Qty.
Cylinder	CTA40U - CTA40	IT15649 - IT12675	1
Helm pump	Choose the pump model according to the desired wheel turns below		1
Hydraulic oil	VG22	IT21334	3
Bypass	Choose the bypass model according to the pump-cylinder combination in the table below		1
In case of additional station add:			
Second station helm pump	Same pump model as above	(see table on page bottom)	1
Second station fittings kit		IT23376 - IT23487	1
Hydraulic oil	VG22	IT21334	1
In case of autopilot installation please add:			
Autopilot power unit	Choose autopilot power unit model in the Order Guide on pages 43-44		1
Autopilot fittings kit		IT23377 - IT23489	1

## PUMP-CYLINDER COMBINATION

		HELM PUMP		
<p>Choose combination between pump and cylinder according to the desired number of wheel turns lock-to-lock.                      Note: the requested effort on the steering wheel is inversely proportional to the wheel turns number lock-to-lock:</p> <ul style="list-style-type: none"> <li>• less wheel turns, more effort</li> <li>• more wheel turns, less effort</li> </ul> <p>Note: by increasing the wheel diameter within the specified limitations, the requested effort is reduced.</p>				
		P20BAP Cod. IT21173 P20BA Cod. IT16192 (*)	P30BAP Cod. IT21174 P30BA Cod. IT16193 (*)	P42BAP Cod. IT21175 P42BA Cod. IT16194 (*)
CYLINDER				
	CTA40U - Cod. / Part # IT15649 CTA40 - Cod. / Part # IT12675	# of wheel turns: 5,8 Min. hose size: 5/16" I.D. Tiller: 153 mm - 6,02 in. Angle: 35° + 35° Torque: 57,83 Kgm - 5028 in/lb Min. wheel diam.: 350 mm-13,77 in. Bypass: cod. IT23186 - IT12216	# of wheel turns: 3,9 Min. hose size: 5/16" I.D. Tiller: 153 mm - 6,02 in. Angle: 35° + 35° Torque: 57,83 Kgm - 5028 in/lb Min. wheel diam.: 350 mm-13,77 in. Bypass: cod. IT23186 - IT12216	






Rudder torque calculated at the working pressure of 70 bar (1000 psi).

(\*) For more details, see the basic helm section starting on page 9 to choose the desired mounting configuration.

# SYSTEM 2

ALUMINUM CYLINDER			
Components	Model	Code	Qty.
Cylinder	CTA65U - CTA65 CTA75U - CTA75	IT12677 - IT12676 IT15763 - IT12678	1
Helm pump	Choose the pump model according to the desired wheel turns in the table below		1
Hydraulic Oil	VG22	IT21334	3
Bypass	Choose the bypass model according to the Pump-Cylinder combination in the table below		1
In case of additional station add:			
Second station helm pump	Same pump model as above	(see table at bottom of page)	1
Second station fittings kit		IT23376 - IT23487	1
Hydraulic oil	VG22	IT21334	1
In case of autopilot installation please add:			
Autopilot power unit(****)	Choose autopilot power unit model in the Order Guide on pages 43-44		1
Autopilot fittings kit		IT23377 - IT23487 (****)	1

## PUMP-CYLINDER COMBINATION

		HELM PUMP		
<p>Choose combination between pump and cylinder according to the desired number of wheel turns lock-to-lock.            Note: the requested effort on the steering wheel is inversely proportional to the wheel turns number lock-to-lock:</p> <ul style="list-style-type: none"> <li>• less wheel turns, more effort</li> <li>• more wheel turns, less effort</li> </ul> <p>Note: by increasing the wheel diameter within the specified limitations, the requested effort is reduced.</p>				
		P20BAP Cod. IT21173 P20BA Cod. IT16192 (*)	P30BAP Cod. IT21174 P30BA Cod. IT16193 (*)	P42BAP Cod. IT21175 P42BA Cod. IT16194 (*)
CYLINDER		<p>N. of wheel turns: 5,6            Min. hose size: 5/16" I.D.            Tiller: 153 mm - 6,02 in.            Angle: 35° + 35°            Torque: 83,81 Kgm - 7287 in/lb            Min. wheel diam: 350 mm-13,77 in.            Bypass: cod. IT23186 - IT12216</p>		
	CTA65U - Cod. / Part # IT12677 CTA65 - Cod. / Part # IT12676			
		<p>N. of wheel turns: 6,3            Min. hose size: 5/16" I.D.            Tiller : 175 mm - 6,89 in.            Angle: 35° + 35°            Torque: 94,17 Kgm - 8188 in/lb            Min. wheel diam: 350 mm-13,77 in.            Bypass: cod. IT23186 - IT12216</p>		
	CTA75U - Cod. / Part # IT15763 CTA75 - Cod. / Part # IT12678			

Rudder torque calculated at the working pressure of 70 bar (1000 psi).







(\*) For more details, see the basic helm section starting on page 9 and choose the desired mounting configuration.

(\*\*\*\*) In case an autopilot with power unit filling is installed, the fitting kit is code IT23376 - IT23487.

# SYSTEM 3

ALUMINUM CYLINDER			
Components	Model	Code	Qty.
Cylinder	CTA80U - CTA80	IT12682 - IT12679	1
Helm pump	Choose the pump model according to the desired wheel turns below		1
Hydraulic oil	VG22	IT21334	3
Bypass	Choose the bypass model according to the Pump-Cylinder combination in the table below		1
In case of additional station add:			
Second station helm pump	Same pump model as above	(see table on page bottom)	1
Second station fittings kit		IT23376 or IT23418 (***) IT23487 or IT23488 (***)	1
Hydraulic oil	VG22	IT21334	1
In case of autopilot installation please add:			
Autopilot power unit(****)	Choose autopilot power unit model on pages 43-44		1
Autopilot fittings kit(****)		IT23377 or IT23373 (***) IT23489 or IT23490 (***)	1

## PUMP-CYLINDER COMBINATION

		HELM PUMP		
<p>Choose combination between pump and cylinder according to the desired number of wheel turns lock-to-lock.            Note: the requested effort on the steering wheel is inversely proportional to the wheel turns number lock-to-lock:</p> <ul style="list-style-type: none"> <li>• less wheel turns, more effort</li> <li>• more wheel turns, less effort</li> </ul> <p>Note: by increasing the wheel diameter within the specified limitations, the requested effort is reduced.</p>				
		P20BAP Cod. IT21173 P20BA Cod. IT16192 (*)	P30BAP Cod. IT21174 P30BA Cod. IT16193 (*)	P42BAP Cod. IT21175 P42BA Cod. IT16194 (*)
CYLINDER		 <p>N. of wheel turns: 7,2            Min. hose size: 5/16" I.D. Tiller:            200 mm - 7,87 in.            Angle: 35° + 35°            Torque:            107,36 Kgm - 9335 in/lb            Min. wheel diam:            350 mm-13,77 in.            Bypass: cod.            IT23186 - IT12216</p>		 <p>N. of wheel turns: 5,1            Min. hose size:            5/16" - 3/8" I.D.            Tiller: 200 mm - 7,87 in.            Angle: 35° + 35°            Torque:            107,36 Kgm - 9335 in/lb            Min. wheel diam: 450 mm-            17,71 in.            Bypass: cod.            IT23186 - IT23480 (***)            IT12216 - IT16968 (***)</p>
	CTA80U Cod. / Part # IT12682 CTA80 - Cod. / Part # IT12679			

Rudder torque calculated at the working pressure of 70 bar (1000 psi).

(\*) For more details, see the basic helm section starting on page 9 to choose the desired mounting configuration.






(\*\*\*) It is suggested for combination with 42cc helm pump if the total length between pump and cylinder exceeds 8 mt - 24'.

(\*\*\*\*) In case an autopilot power unit with automatic filling is installed, the fitting kits are respectively the code IT23376-IT23418/IT23487 - IT23488

# SYSTEM 4

BRASS CYLINDER			
Components	Model	Code	Qty.
Cylinder	CTB110U - CTB130U CTB110 - CTB130	IT12687 - IT12691 IT12683 - IT15606	1
Helm pump	Choose the pump model according to the desired wheel turns below		1
Hydraulic oil	VG22	IT21334	3
Bypass	Choose the bypass model according to the Pump-cylinder combination in the table below		1
In case of additional station add:			
Second station helm pump	Same pump model as above	(see table on next page)	1
Second station fittings kit		IT23376 - IT23418 (***) IT23487 - IT23488 (***)	1
Hydraulic oil	VG22	IT23377 - IT23373 (***) IT23489 - IT23490 (***)	1
In case of autopilot installation please add:			
Autopilot power unit(****)	Choose autopilot power unit model in the Order Guide on pages 43-44		1
Autopilot fittings kit		IT23373 (****) - IT23490 (***)	1

## PUMP-CYLINDER COMBINATION

		HELM PUMP		
<p>Choose combination between pump and cylinder according to the desired number of wheel turns lock-to-lock. Note: the requested effort on the steering wheel is inversely proportional to the wheel turns number lock-to-lock:</p> <ul style="list-style-type: none"> <li>• less wheel turns, more effort</li> <li>• more wheel turns, less effort</li> </ul> <p>Note: by increasing the wheel diameter within the specified limitations, the requested effort is reduced.</p>				
		P20BAP Cod. IT21173 P20BA Cod. IT16192 (*)	P30BAP Cod. IT21174 P30BA Cod. IT16193 (*)	P42BAP Cod. IT21175 P42BA Cod. IT16194 (*)
CYLINDER		/	/	# of wheel turns: 6,7 Min. hose size: 3/8" I.D. Tiller: 153 mm - 6,02 in. Angle: 35° + 35° Torque: 140,85 Kgm - 12247 in/lb Min. wheel diam: 450 mm-17,71 in. Bypass: cod. IT23186 - IT23480 (***) IT12216 - IT16968 (***)
	CTB110U - Cod. / Part # IT12687 CTB110 - Cod. / Part # IT12683			
		/	/	N. of wheel turns: 7,7 Min. hose size: 3/8" I.D. Tiller: 180 mm - 7 in. Angle: 35° + 35° Torque: 140,85 Kgm - 12247 in/lb Min. wheel diam: 450 mm-17,71 in. Bypass: cod. IT23186 - IT23480 (***) IT12216 - IT16968 (***)
	CTB130U Cod. / Part # IT12691 CTB130 - Cod. / Part # IT15606			

Rudder torque calculated at the working pressure of 70 bar (1000 psi).

(\*) For more details, see the basic helm section on page 9 to choose the desired mounting configuration.

(\*\*\*) It is suggested for combination with 42cc helm pump if the total length between pump and cylinder exceeds 8 mt - 24'.

(\*\*\*\*) In case an autopilot power unit with automatic filling is installed, the fitting kit is code IT23376 - IT23418 / IT23487 - IT23488.

### Steering Effort Key

LIGHT 






NORMAL 

HEAVY 

# SYSTEM 5

BRASS CYLINDER			
Components	Model	Code	Qty.
Cylinder	CTB145U - CTB145	IT12694 - IT12692	1
Helm pump	Choose the pump model according to the desired wheel turns below		1
Hydraulic oil	VG22	IT21334	3
Bypass	Choose the bypass model according to the Pump-Cylinder combination in the table here below		1
In case of additional station add:			
Second station helm pump	Same pump model as above	(see table on page bottom)	1
Second station fittings kit		IT23418 - IT21488	1
Hydraulic oil	VG22	IT21334	1
In case of autopilot installation please add:			
Autopilot power unit(****)	Choose autopilot power unit model on pages 43-44		1
Autopilot fittings kit		IT23373 - IT23490 (****)	1

## PUMP-CYLINDER COMBINATION

		HELM PUMP		
<p>Choose combination between pump and cylinder according to the desired number of wheel turns lock-to-lock.            Note: the requested effort on the steering wheel is inversely proportional to the wheel turns number lock-to-lock:</p> <ul style="list-style-type: none"> <li>• less wheel turns, more effort</li> <li>• more wheel turns, less effort</li> </ul> <p>Note: by increasing the wheel diameter within the specified limitations, the requested effort is reduced.</p>				
		P20BAP Cod. IT21173 P20BA Cod. IT16192 (*)	P30BAP Cod. IT21174 P30BA Cod. IT16193 (*)	P42BAP Cod. IT21175 P42BA Cod. IT16194 (*)
CYLINDER				 <p>N. of wheel turns: 8,6            Min. hose size: 3,8" I.D.            Tiller: 200 mm - 7,8 in.            Angle: 35° + 35°            Torque: 140,85 Kgm - 12247 in/lb            Min. wheel diam: 450 mm-17,71 in.            Bypass: cod. IT23480 - IT16968</p>
	CTB145 - Cod. / Part # IT12694 CTB145 - Cod. / Part # IT12692			

Rudder torque calculated at the working pressure of 70 bar (1000 psi).

(\*) For more details, see the basic helm section on page 9 to choose the desired mounting configuration.

(\*\*\*\*) In case an autopilot power unit with automatic filling is installed, the fitting kit is code IT23418 - IT23488.

# SYSTEM 6

SINGLE-station steering system				DOUBLE-station steering system			
Components	Model	Code	Qty.	Components	Model	Code	Qty.
Cylinder	CTC200	IT12695	1	Cylinder	CTC200	IT12695	1
Flexible hoses for cylinder	Included	/	2	Flexible hoses for cylinder	Included	/	2
Main station pump	P63S	IT13995	1	Main station pump	P63T	IT13996	1
Second station pump	/	/	/	Second station pump	P63S	IT13995	1
Pump fittings kit		IT14359 IT14360	2	Pump fittings kit		IT23492 IT23493**	1
Suggested min. hose size	Copper tube d.e.12 x 1 mm or Copper tube d.e. 14 x 1 mm	/	/	Suggested min. hose size	Copper tube d.e.12 x 1 mm or Copper tube d.e. 14 x 1 mm	/	/
Hydraulic oil	VG22	IT21334	4	Hydraulic oil	VG22	IT21334	4
See on page bottom for bypass and valve selection according to pump type and tube length							
In case of autopilot installation please add:							
Autopilot power unit	Choose autopilot power unit model in the Order Guide on pages 43-44		1	Autopilot power unit	Choose autopilot power unit model in the Order Guide on pages 43-44		1

## PUMP-CYLINDER COMBINATION

<b>CYLINDER</b>	<p>Choose combination between pump and cylinder according to the desired number of wheel turns lock-to-lock. Note: the requested effort on the steering wheel is inversely proportional to the wheel turns number lock-to-lock:</p> <ul style="list-style-type: none"> <li>• less wheel turns, more effort</li> <li>• more wheel turns, less effort</li> </ul> <p>Note: by increasing the wheel diameter, the requested effort is reduced.</p>	<b>HELM PUMP</b>	
	 <p>CTC200 Cod. / Part # IT12695</p>	 <p>P63T Cod. IT13996 (*)</p>	 <p>P63S Cod. IT13995 (*)</p>
<p>No. of wheel turns: 7,9 Min. hose size: copper tube d.e. 12x1 mm or copper tube d.e. 14x1 mm (**) Tiller: 175 MM / 6.9 in. Angle: 35° + 35° Torque: 249,93 Kgm / 21643 lb.in. Min. wheel diam.: 700 mm - 27,56 in.</p>			

Pump	# of stations	Kit Fittings Code		Valve and Bypass code				Type and length of copper tube between pump and cylinder	
		< 15 mt - 45'	> 15 mt - 45'	Non return valve	Relief valve	Non return valve Bypass	Manual Bypass		
P63	1	IT14359 x 2 Qty.			IT23500	IT15707		Copper tube d.e. 12 x 1 mm	< 15 mt - 45'
	1		IT14360 x 2 Qty.		IT23501	IT17672		Copper tube d.e. 14 x 1 mm	> 15 mt - 45'
	2	IT23492		IT15708	IT23500		IT16968	Copper tube d.e. 12 x 1 mm	< 15 mt - 45'
	2		IT23493	IT23513	IT23501		IT12134	Copper tube d.e. 14 x 1 mm	> 15 mt - 45'

# SYSTEM 7

SINGLE-station steering system				DOUBLE-station steering system			
Components	Model	Code	Qty.	Components	Model	Code	Qty.
Cylinder	CTC230	IT12698	1	Cylinder	CTC230	IT12698	1
Flexible hoses for cylinder	Included	/	2	Flexible hoses for cylinder	Included	/	2
Main station pump	P63S	IT13995	1	Main station pump	P63T	IT13996	1
Second station pump	/	/	/	Second station pump	P63S	IT13995	1
Pump fittings kit		IT14359 IT14360	2	Pump fittings kit		IT23492 IT23493**	1
Suggested min. hose size	Copper tube d.e.12 x 1 mm or Copper tube d.e. 14 x 1 mm	/	/	Suggested min. hose size	Copper tube d.e.12 x 1 mm or Copper tube d.e. 14 x 1 mm	/	/
Hydraulic oil	VG22	IT21334	4	Hydraulic oil	VG22	IT21334	4
See on page bottom for bypass and valve selection according to pump type and tube length							
In case of autopilot installation please add:							
Autopilot power unit	Choose autopilot power unit model in the Order Guide on pages 43-44		1	Autopilot power unit	Choose autopilot power unit model in the Order Guide on pages 43-44		1

## PUMP-CYLINDER COMBINATION

Choose combination between pump and cylinder according to the desired number of wheel turns lock-to-lock.  
Note: the requested effort on the steering wheel is inversely proportional to the wheel turns number lock-to-lock:


- less wheel turns, more effort
- more wheel turns, less effort

Note: by increasing the wheel diameter within the specified limitations, the requested effort is reduced.

### HELM PUMP




P63T  
Cod. IT13996 (\*)



P63S  
Cod. IT13995 (\*)

**CYLINDER**



CTC230  
Cod. / Part # IT12698

No. of wheel turns: 7,9  
Min. hose size: copper tube d.e. 12x1 mm or copper tube d.e. 14x1 mm (\*\*)  
Tiller: 175 MM / 6.9 in.  
Angle: 35° + 35°  
Torque: 249,93 Kgm / 21643 lb.in.  
Min. wheel diam.: 700 mm - 27,56 in.

Pump	# of stations	Kit Fittings Code		Valve and Bypass code				Type and length of copper tube between pump and cylinder	
		< 15 mt - 45'	> 15 mt - 45'	Non return valve	Relief valve	Non return valve Bypass	Manual Bypass		
P63	1	IT14359 x 2 Qty.			IT23500	IT15707		Copper tube d.e. 12 x 1 mm	< 15 mt - 45'
	1		IT14360 x 2 Qty.		IT23501	IT17672		Copper tube d.e. 14 x 1 mm	> 15 mt - 45'
	2	IT23492		IT15708	IT23500		IT16968	Copper tube d.e. 12 x 1 mm	< 15 mt - 45'
	2		IT23493	IT23513	IT23501		IT12134	Copper tube d.e. 14 x 1 mm	> 15 mt - 45'



# SYSTEM 8









SINGLE-Station Steering System				DOUBLE-Station Steering System			
Components	Model	Code	Qty.	Components	Model	Code	Qty.
Cylinder	CTC300	IT12701	1	Cylinder	CTC300	IT12701	1
Flexible hoses for cylinder	Included	/	2	Flexible hoses for cylinder	Included	/	2
Main station pump	P63S or P89S	IT13995 IT14002	1	Main station pump	P63T or P89T	IT13996 IT14003	1
Second station pump	/	/	/	Second station pump	P63S or P89S	IT13995 IT14002	1
Pump fittings kit		IT14360 IT14361**	2	Pump fittings kit		IT23493 IT23452**	1
Suggested min. hose size	Copper tube d.e.14 x 1 mm or Copper tube d.e.18 x 1,5 mm**		/	Suggested min. hose size	Copper tube d.e.14 x 1 mm or Copper tube d.e.18 x 1,5 mm**		/
Hydraulic oil	VG22	IT21334	4	Hydraulic oil	VG22	IT21334	4
See on page bottom for bypass and valve selection according to pump type and tube length							
In case of autopilot installation please add:							
Autopilot power unit	Choose autopilot power unit model in the Order Guide on pages 43-44		1	Fittings kit for autopilot	Choose autopilot power unit model in the Order Guide on pages 43-44		1

## PUMP-CYLINDER COMBINATION

Choose combination between pump and cylinder according to the desired number of wheel turns lock-to-lock.  
Note: the requested effort on the steering wheel is inversely proportional to the wheel turns number lock-to-lock:

- less wheel turns, more effort
- more wheel turns, less effort

Note: by increasing the wheel diameter within the specified limitations, the requested effort is reduced.

CYLINDER	Image	HELM PUMP			
		P63T Cod. IT13996 (*)	P63S Cod. IT13995 (*)	P89T Cod. IT14003 (*)	P89S Cod. IT14002 (*)
CTC300 Cod. / Part # IT12701					
	No. of wheel turns: 11,9 Copper tube d.e. 14x1 mm or copper tube d.e. 18x1,5 mm (**) Tiller: 260 MM / 10,24 in. Angle: 35° + 35° Torque: 374,89 Kgm / 32465 lb.in. Min. wheel diam.: 700 mm - 27,56 in.				
	No. of wheel turns: 8,4 Copper tube d.e. 14x1 mm or copper tube d.e. 18x1,5 mm (**) Tiller: 260 MM / 10,24 in. Angle: 35° + 35° Torque: 374,89 Kgm / 32465 lb.in. Min. wheel diam.: 700 mm - 27,56 in.				

(\*)Max. rudder torque calculated at a working pressure of 70 bar/1000 psi. See the heavy duty pumps section on page 14 for more information.

(\*\*) To be used when the hose length between pump and cylinder exceeds 15 mt - 45'.

Pump	# of stations	Kit Fittings Code		Valve and Bypass Code				Type and length of copper tube between pump and cylinder	
		< 15 mt - 45'	> 15 mt - 45'	Non return valve	Relief valve	Non return valve Bypass	Manual Bypass		
P63	1	IT14360 x 2 Qty.			IT23501	IT17672		Copper tube d.e. 14 x 1 mm	< 15 mt - 45'
	1		IT14361 x 2 Qty.		IT23503	IT15709		Copper tube d.e. 18 x 1,5 mm	> 15 mt - 45'
	2	IT23493		IT23513	IT23501		IT12134	Copper tube d.e. 14 x 1 mm	< 15 mt - 45'
	2		IT23452			IT23503	IT15709 x 2 Qty.	Copper tube d.e. 18 x 1,5 mm	> 15 mt - 45'
P89	1	IT14360 x 2 Qty.			IT23501	IT17672		Copper tube d.e. 14 x 1 mm	< 15 mt - 45'
	1		IT14361 x 2 Qty.		IT23503	IT15709		Copper tube d.e. 18 x 1,5 mm	> 15 mt - 45'
	2	IT23493		IT23513	IT23501		IT12134	Copper tube d.e. 14 x 1 mm	< 15 mt - 45'
	2		IT23452			IT23503	IT15709 x 2 Qty.	Copper tube d.e. 18 x 1,5 mm	> 15 mt - 45'

Steering Effort Key

LIGHT



NORMAL



HEAVY



# SYSTEM 9






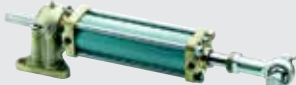
SINGLE-Station Steering System				DOUBLE-Station Steering System			
Components	Model	Code	Qty.	Components	Model	Code	Qty.
Cylinder	CTC400 or CTC310	IT15697 IT15698	1	Cylinder	CTC400 or CTC310	IT15697 IT15698	1
Flexible hoses for cylinder	Included	/	2	Flexible hoses for cylinder	Included	/	2
Main station pump	P63S or P89S	IT13995 IT14002	1	Main station pump	P63T or P89T	IT13996 IT14003	1
Second station pump	/	/	/	Second station pump	P63S or P89S	IT13995 IT14002	1
Pump fittings kit		IT14360 IT14361**	2	Pump fittings kit		IT23493 IT23452	1
Suggested min. hose size	Copper tube d.e.14 x 1 mm or Copper tube d.e.18 x 1,5 mm**	/	/	Suggested min. hose size	Copper tube d.e.14 x 1 mm or Copper tube d.e.18 x 1,5 mm**	/	/
Hydraulic oil	VG22	IT21334	4	Hydraulic oil	VG22	IT21334	4
See on page bottom for bypass and valve selection according to pump type and tube length							
In case of autopilot installation please add:							
Autopilot power unit	Choose autopilot power unit model in the Order Guide on pages 43-44		1	Fittings kit for autopilot	Choose autopilot power unit model in the Order Guide on pages 43-44		1

## PUMP-CYLINDER COMBINATION

Choose combination between pump and cylinder according to the desired number of wheel turns lock-to-lock. Note: the requested effort on the steering wheel is inversely proportional to the wheel turns number lock-to-lock:

- less wheel turns, more effort
- more wheel turns, less effort

Note: by increasing the wheel diameter within the specified limitations, the requested effort is reduced.

		HELM PUMP			
					
		P63T Cod. IT13996 (*)	P63S Cod. IT13995 (*)	P89T Cod. IT14003 (*)	P89S Cod. IT14002 (*)
CYLINDER		No. of wheel turns: 15,9 Copper tube d.e. 14x1 mm or copper tube d.e. 18x1,5 mm (**) Tiller: 350 mm / 13,78 in. Angle: 35° + 35° Torque: 400 Kgm / 34780 lb.in. Min. wheel diam.: 700 mm - 27,56 in.		No. of wheel turns: 11,2 Copper tube d.e. 14x1 mm or copper tube d.e. 18x1,5 mm (**) Tiller: 350 mm / 13,78 in. Angle: 35° + 35° Torque: 400 Kgm / 34780 lb.in. Min. wheel diam.: 700 mm - 27,56 in.	
		No. of wheel turns: 13,4 Copper tube d.e. 14x1 mm or copper tube d.e. 18x1,5 mm (**) Tiller: 175 mm / 6,88 in. Angle: 35° + 35° Torque: 422 Kgm / 36693 lb.in. Min. wheel diam.: 700 mm - 27,56 in.		No. of wheel turns: 9,5 Copper tube d.e. 14x1 mm or copper tube d.e. 18x1,5 mm (**) Tiller: 260 mm / 10,24 in. Angle: 35° + 35° Torque: 422 Kgm / 36693 lb.in. Min. wheel diam.: 700 mm - 27,56 in.	
	CTC400 Cod. / Part # IT15697				
	CTC310 Cod. / Part # IT15698				

(\*) Max. rudder torque calculated at a working pressure of 70 bar/1000 psi. See the specific heavy duty pumps section on page 14 for more information.

(\*\*) To be used when the hose length between pump and cylinder exceeds 15 mt - 45'.

Pump	# of stations	Kit Fittings Code		Valve and Bypass code				Type and length of copper tube between pump and cylinder	
		< 15 mt - 45'	> 15 mt - 45'	Non return valve	Relief valve	Non return valve Bypass	Manual Bypass		
P63	1	IT14360 x 2 Qty.			IT23501	IT17672		Copper tube d.e. 14 x 1 mm	< 15 mt - 45'
	1		IT14361 x 2 Qty.		IT23503	IT15709		Copper tube d.e. 18 x 1,5 mm	> 15 mt - 45'
	2	IT23493		IT23513	IT23501		IT12134	Copper tube d.e. 14 x 1 mm	< 15 mt - 45'
	2		IT23452		IT23503	IT15709 x 2 Qty.		Copper tube d.e. 18 x 1,5 mm	> 15 mt - 45'
P89	1	IT14360 x 2 Qty.			IT23501	IT17672		Copper tube d.e. 14 x 1 mm	< 15 mt - 45'
	1		IT14361 x 2 Qty.		IT23503	IT15709		Copper tube d.e. 18 x 1,5 mm	> 15 mt - 45'
	2	IT23493		IT23513	IT23501		IT12134	Copper tube d.e. 14 x 1 mm	< 15 mt - 45'
	2		IT23452		IT23503	IT15709 x 2 Qty.		Copper tube d.e. 18 x 1,5 mm	> 15 mt - 45'

# SYSTEM 10

SINGLE-Station Steering System				DOUBLE-Station Steering System			
Components	Model	Code	Qty.	Components	Model	Code	Qty.
Cylinder	CTD450	IT15699	1	Cylinder	CTD450	IT15699	1
Flexible hoses for cylinder	Included	/	2	Flexible hoses for cylinder	Included	/	2
Main station pump	P89S or P105	IT14002 IT14052	1	Main station pump	P89T or P105	IT14003 IT14052	1
Second station pump	/	/	/	Second station pump	P89S or P105	IT14002 IT14052	1
Pump fittings kit		IT14360 IT14361**	2	Pump fittings kit	See table on page bottom		1
Suggested min. hose size	Copper tube d.e.14 x 1 mm or Copper tube d.e.18 x 1,5 mm**		/	Suggested min. hose size	Copper tube d.e.14 x 1 mm or Copper tube d.e.18 x 1,5 mm**		/
Hydraulic oil	VG22	IT21334	4	Hydraulic oil	VG22	IT21334	4
See on page bottom for bypass and valve selection according to pump type and tube length							
In case of autopilot installation please add:							
Autopilot power unit	Choose autopilot power unit model in the Order Guide on pages 43-44		1	Fittings kit for autopilot	Choose autopilot power unit model in the Order Guide on pages 43-44		1

## PUMP-CYLINDER COMBINATION

Choose combination between pump and cylinder according to the desired number of wheel turns lock-to-lock.

Note: the requested effort on the steering wheel is inversely proportional to the wheel turns number lock-to-lock:

- less wheel turns, more effort
- more wheel turns, less effort

Note: by increasing the wheel diameter within the specified limitations, the requested effort is reduced.

**CYLINDER**



CTD450  
Cod. / Part #IT15699

HELM PUMP		
		
P89T Cod. IT14003 (*)	P89S Cod. IT14002 (*)	P105 Cod. IT14052 (*)
No. of wheel turns: 14,2 Copper tube d.e. 14x1 mm or copper tube d.e. 18x1,5 mm (**) Tiller: 260 mm / 10,24 in. Angle: 35° + 35° Torque: 633 Kgm / 55040 lb.in. Min. wheel diam.: 700 mm - 27,56 in.	No. of wheel turns: 14,2 Copper tube d.e. 14x1 mm or copper tube d.e. 18x1,5 mm (**) Tiller: 260 mm / 10,24 in. Angle: 35° + 35° Torque: 633 Kgm / 55040 lb.in. Min. wheel diam.: 700 mm - 27,56 in.	No. of wheel turns: 12,1 Copper tube d.e. 14x1 mm or copper tube d.e. 18x1,5 mm (**) Tiller: 260 mm / 10,24 in. Angle: 35° + 35° Torque: 633 Kgm / 55040 lb.in. Min. wheel diam.: 1000 mm - 39,37 in.

(\*) Max. rudder torque calculated at a working pressure of 70 bar/1000 psi. See the specific heavy duty pumps section on page 14 for more information.

(\*\*) To be used when the hose length between pump and cylinder exceeds 15 mt - 45'.

Pump	# of stations	Kit Fittings Code		Valve and Bypass Code				Type and length of copper tube between pump and cylinder	
		< 15 mt - 45'	> 15 mt - 45'	Non return valve	Relief valve	Non return valve Bypass	Manual Bypass		
P89	1	IT14360 x 2 Qty.			IT23501	IT17672		Copper tube d.e. 14 x 1 mm	< 15 mt - 45'
	1		IT14361 x 2 Qty.		IT23503	IT15709		Copper tube d.e. 18 x 1,5 mm	> 15 mt - 45'
	2	IT23493		IT23513	IT23501		IT12134	Copper tube d.e. 14 x 1 mm	< 15 mt - 45'
	2		IT23452		IT23503	IT15709 x 2 Qty.		Copper tube d.e. 18 x 1,5 mm	> 15 mt - 45'
P105	1	Included			IT23503	IT15709		Copper tube d.e. 18 x 1,5 mm	Any length
	2	IT23518			IT23503	IT15709 x 2 Qty.		Copper tube d.e. 18 x 1,5 mm	Any length

Steering Effort Key

LIGHT



NORMAL



HEAVY



# SYSTEM 11







SINGLE-Station Steering System				DOUBLE-Station Steering System			
Components	Model	Code	Qty.	Components	Model	Code	Qty.
Cylinder	CTE600	IT15700	1	Cylinder	CTE600	IT15700	1
Flexible hoses for cylinder	Included	/	2	Flexible hoses for cylinder	Included	/	2
Main station pump	P89S P105 P151 P191	IT14002 IT14052 IT14082 IT14084	1	Main station pump	P89T P105 P151 P191	IT14003 IT14052 IT14082 IT14084	1
Second station pump	/	/	/	Second station pump	P89S P105 P151 P191	IT14002 IT14052 IT14082 IT14084	1
Pump fittings kit		IT14360 IT14361**	2	Pump fittings kit	See table on page bottom		1
Suggested min. hose size	Copper tube d.e.14 x 1 mm or Copper tube d.e.18 x 1,5 mm**		/	Suggested min. hose size	Copper tube d.e.14 x 1 mm or Copper tube d.e.18 x 1,5 mm**		/
Hydraulic oil	VG22	IT21334	4	Hydraulic oil	VG22	IT21334	4
See on page bottom for bypass and valve selection according to pump type and tube length							
In case of autopilot installation please add:							
Autopilot power unit	Choose autopilot power unit model in the Order Guide on pages 43-44		1	Fittings kit for autopilot	Choose autopilot power unit model in the Order Guide on pages 43-44		1

## PUMP-CYLINDER COMBINATION

Choose combination between pump and cylinder according to the desired number of wheel turns lock-to-lock. Note: the requested effort on the steering wheel is inversely proportional to the wheel turns number lock-to-lock:

- less wheel turns, more effort
- more wheel turns, less effort

Note: by increasing the wheel diameter within the specified limitations, the requested effort is reduced.

		HELM PUMP					
							
		P89T Cod. IT14003 (*)	P89S Cod. IT14002 (*)	P105 Cod. IT14052 (*)	P151 Cod. IT14082 (*)	P191 Cod. IT14084 (*)	
CYLINDER		No. of wheel turns: 14,8 Copper tube d.e. 14x1 mm or copper tube d.e. 18x1,5 mm (**) Tiller: 175 mm/6,89 in. Angle: 35° + 35° Torque: 660 Kg/57387 lb.in. Min. wheel diam.: 700 mm - 27,56 in.		No. of wheel turns: 12,6 Copper tube d.e. 14x1 mm or copper tube d.e. 18x1,5 mm (**) Tiller: 175 mm/ 6,89 in. Angle: 35° + 35° Torque: 660 Kg/ 57387 lb.in. Min. wheel diam.: 1000 mm-39,37 in.		No. of wheel turns: 8,7 Copper tube d.e. 14x1 mm or copper tube d.e. 18x1,5 mm (**) Tiller: 175 mm/ 6,89 in. Angle: 35°+35° Torque: 660 Kg/ 57387 lb.in. Min. wheel diam.: 1000 mm-39,37 in.	
	CTE600 Cod. / Part # IT15700	No. of wheel turns: 6,9 Copper tube d.e. 14x1 mm or copper tube d.e. 18x1,5 mm (**) Tiller: 175 mm/ 6,89 in. Angle: 35°+35° Torque: 660 Kg/ 57387 lb.in. Min. wheel diam.: 1000 mm-39,37 in.					

(\*) Max. rudder torque calculated at a working pressure of 70 bar/1000 psi. See the specific heavy duty pumps section on page 14 for more information.  
 (\*\*\*) To be used when the hose length between pump and cylinder exceeds 15 mt - 45'.

Pump	# of stations	Kit Fittings Code		Valve and Bypass Code				Type and length of copper tube between pump and cylinder	
		< 15 mt - 45'	> 15 mt - 45'	Non return valve	Relief valve	Non return valve Bypass	Manual Bypass		
P89	1	IT14360 x 2 Qty.			IT23501	IT17672		Copper tube d.e. 14 x 1 mm	< 15 mt - 45'
	1		IT14361 x 2 Qty.		IT23503	IT15709		Copper tube d.e. 18 x 1,5 mm	> 15 mt - 45'
	2	IT23493		IT23513	IT23501		IT12134	Copper tube d.e. 14 x 1 mm	< 15 mt - 45'
	2		IT23452		IT23503	IT15709 x 2 Qty.		Copper tube d.e. 18 x 1,5 mm	> 15 mt - 45'
P105 P151 P191	1	Included			IT23503	IT15709		Copper tube d.e. 18 x 1,5 mm	Any length
	2	IT23518			IT23503	IT15709 x 2 Qty.		Copper tube d.e. 18 x 1,5 mm	Any length

# SYSTEM 12

SINGLE-Station Steering System				DOUBLE-Station Steering System			
Components	Model	Code	Qty.	Components	Model	Code	Qty.
Cylinder	CTE900	IT15701	1	Cylinder	CTE900	IT15701	1
Flexible hoses for cylinder	Included	/	2	Flexible hoses for cylinder	Included	/	2
Main station pump	P105 P151 P191	IT14052 IT14082 IT14084	1	Main station pump	P105 P151 P191	IT14052 IT14082 IT14084	1
Second station pump	/	/	/	Second station pump	P105 P151 P191	IT14052 IT14082 IT14084	1
Pump fittings kit	Included	/	/	Pump fittings kit		IT23518	1
Suggested min. hose size	Copper tube d.e.18 x 1,5 mm			Suggested min. hose size	Copper tube d.e.18 x 1,5 mm		
Hydraulic oil	VG22	IT21334	4	Hydraulic oil	VG22	IT21334	4
See on page bottom for bypass and valve selection according to pump type and tube length							
In case of autopilot installation please add:							
Autopilot power unit	Choose autopilot power unit model on pages 43-44		1	Fittings kit for autopilot	Choose autopilot power unit model on pages 43-44		1




## PUMP-CYLINDER COMBINATION

Choose combination between pump and cylinder according to the desired number of wheel turns lock-to-lock. Note: the requested effort on the steering wheel is inversely proportional to the wheel turns number lock-to-lock:

- less wheel turns, more effort
- more wheel turns, less effort

Note: by increasing the wheel diameter within the specified limitations, the requested effort is reduced.



HELM PUMP			
			
P105 Cod. IT14052 (*)	P151 Cod. IT14082 (*)	P191 Cod. IT14084 (*)	
No. of wheel turns: 18,8 Copper tube d.e. 18x1,5 mm Tiller: 260 mm / 10,24 in. Angle: 35° + 35° Torque: 989 Kgm / 85993 lb.in. Min. wheel diam.: 1000 mm - 39,73 in.	No. of wheel turns: 13,1 Copper tube d.e. 18x1,5 mm Tiller: 260 mm / 10,24 in. Angle: 35° + 35° Torque: 989 Kgm / 85993 lb.in. Min. wheel diam.: 1000 mm - 39,73 in.	No. of wheel turns: 10,4 Copper tube d.e. 18x1,5 mm Tiller: 260 mm / 10,24 in. Angle: 35° + 35° Torque: 989 Kgm / 85993 lb.in. Min. wheel diam.: 1000 mm - 39,73 in.	

(\*) Max. rudder torque calculated at a working pressure of 70 bar/1000 psi. See the specific heavy duty pumps section on page 14 for more information.

Pump	# of stations	Kit Fittings Code		Valve and Bypass Code				Type and length of copper tube between pump and cylinder	
		< 15 mt - 45'	> 15 mt - 45'	Non return valve	Relief valve	Non return valve Bypass	Manual Bypass		
P105 P151 P191	1	Included			IT23503	IT15709		Copper tube d.e. 18 x 1,5 mm	Any length
	2	IT23518			IT23503	IT15709 x 2 Qty.		Copper tube d.e. 18 x 1,5 mm	Any length

Steering Effort Key



# SYSTEM 13

SINGLE-Station Steering System				DOUBLE-Station Steering System			
Components	Model	Code	Qty.	Components	Model	Code	Qty.
Cylinder	CTE1200	IT15702	1	Cylinder	CTE1200	IT15702	1
Flexible hoses for cylinder	Included	/	2	Flexible hoses for cylinder	Included	/	2
Main station pump	P151 P191	IT14082 IT14084	1	Main station pump	P151 P191	IT14082 IT14084	1
Second station pump	/	/	/	Second station pump	P151 P191	IT14082 IT14084	1
Pump fittings kit	Included	/	/	Pump fittings kit		IT23518	1
Suggested min. hose size	Copper tube d.e.18 x 1,5 mm		/	Suggested min. hose size	Copper tube d.e.18 x 1,5 mm		/
Hydraulic oil	VG22	IT21334	4	Hydraulic oil	VG22	IT21334	4
See on page bottom for bypass and valve selection according to pump type and tube length							
In case of autopilot installation please add:							
Autopilot power unit	Choose autopilot power unit model on pages 43-44		1	Fittings kit for autopilot	Choose autopilot power unit model on pages 43-44		1

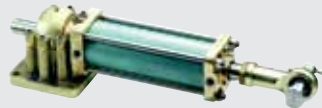
## PUMP-CYLINDER COMBINATION

Choose combination between pump and cylinder according to the desired number of wheel turns lock-to-lock. Note: the requested effort on the steering wheel is inversely proportional to the wheel turns number lock-to-lock:

- less wheel turns, more effort
- more wheel turns, less effort

Note: by increasing the wheel diameter within the specified limitations, the requested effort is reduced.

CYLINDER



CTE1200  
Cod. / Part # IT15702

### HELM PUMP



P151  
Cod. IT14082 (\*)



P191  
Cod. IT14084 (\*)

No. of wheel turns: 17,5  
Copper tube d.e. 18x1,5 mm  
Tiller: 350 mm / 13,78 in.  
Angle: 35° + 35°  
Torque: 1318 Kgm / 114601 lb.in.  
Min. wheel diam.: 1000 mm - 39,37 in.

No. of wheel turns: 13,8  
Copper tube d.e. 18x1,5 mm  
Tiller: 350 mm / 13,78 in.  
Angle: 35° + 35°  
Torque: 1318 Kgm / 114601 lb.in.  
Min. wheel diam.: 1000 mm - 39,37 in.

(\*) Max. rudder torque calculated at a working pressure of 70 bar/1000 psi. See the specific heavy duty pumps section on page 14 for more information.

Pump	# of stations	Kit Fittings Code		Valve and Bypass Code				Type and length of copper tube between pump and cylinder	
		< 15 mt - 45'	> 15 mt - 45'	Non return valve	Relief valve	Non return valve Bypass	Manual Bypass		
P151 P191	1	Included			IT23503	IT15709		Copper tube d.e. 18 x 1,5 mm	Any length
	2	IT23518			IT23503	IT15709 x 2 Qty.		Copper tube d.e. 18 x 1,5 mm	Any length

# SYSTEM 14

SINGLE-Station Steering System				DOUBLE-Station Steering System			
Components	Model	Code	Qty.	Components	Model	Code	Qty.
Cylinder	CTF1600	IT15703	1	Cylinder	CTF1600	IT15703	1
Flexible hoses for cylinder	Included	/	2	Flexible hoses for cylinder	Included	/	2
Main station pump	P191	IT14084	1	Main station pump	P191	IT14084	1
Second station pump	/	/	/	Second station pump	P191	IT14084	1
Pump fittings kit	Included	/	/	Pump fittings kit		IT23518	1
Suggested min. hose size	Copper tube d.e.18 x 1,5 mm		/	Suggested min. hose size	Copper tube d.e.18 x 1,5 mm		/
Hydraulic oil	VG22	IT21334	4	Hydraulic oil	VG22	IT21334	4
See on page bottom for bypass and valve selection according to pump type and tube length							
In case of autopilot installation please add:							
Autopilot power unit	Choose autopilot power unit model in the Order Guide on pages 43-44		1	Fittings kit for autopilot	Choose autopilot power unit model in the Order Guide on pages 43-44		1

## PUMP-CYLINDER COMBINATION

Choose combination between pump and cylinder according to the desired number of wheel turns lock-to-lock. Note: the requested effort on the steering wheel is inversely proportional to the wheel turns number lock-to-lock:

- less wheel turns, more effort
- more wheel turns, less effort

Note: by increasing the wheel diameter within the specified limitations, the requested effort is reduced.

### HELM PUMP



P191  
Cod. IT14084 (\*)

CYLINDER



CTF1600  
Cod. / Part # IT15703

No. of wheel turns: 20,2  
Copper tube d.e. 18x1,5 mm  
Tiller: 350 mm / 13,78 in.  
Angle: 35° + 35°  
Torque: 1928 Kgm / 167640 lb.in.  
Min. wheel diam.: 1000 mm - 39,37 in.

(\*) Max. rudder torque calculated at a working pressure of 70 bar/1000 psi. See the specific heavy duty pumps section on page 14 for more information.

Pump	# of stations	Kit Fittings Code		Valve and Bypass Code				Type and length of copper tube between pump and cylinder	
		< 15 mt - 45'	> 15 mt - 45'	Non return valve	Relief valve	Non return valve Bypass	Manual Bypass		
P191	1	Included			IT23503	IT15709		Copper tube d.e. 18 x 1,5 mm	Any length
	2	IT23518			IT23503	IT15709 x 2 Qty.		Copper tube d.e. 18 x 1,5 mm	Any length

Steering Effort Key

LIGHT



NORMAL



HEAVY

