



SUGGESTIONS AND WARNINGS WHEN SELECTING A MECHANICAL STEERING SYSTEM

Selection of the appropriate mechanical steering system is an important factor for the safety and functionality of your boat.

The combination of engine power, hull type and boat speed influence the correct selection of the steering system.

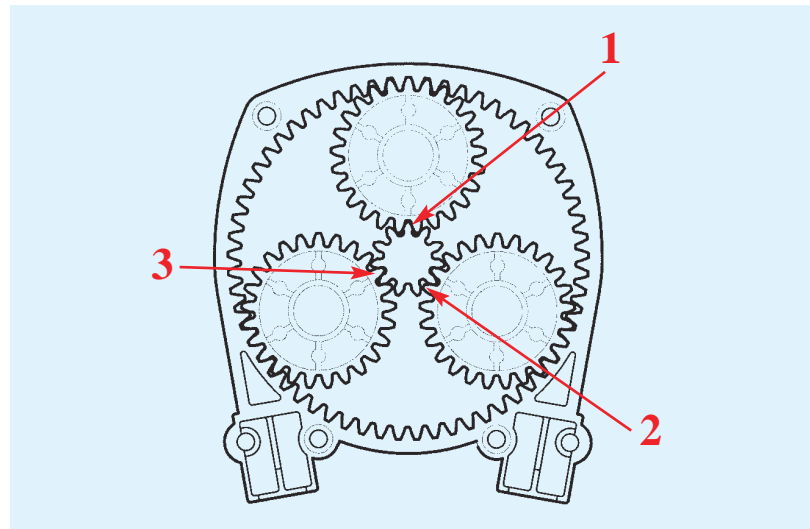
The load on the steering system increases with the boat speed and engine power; the torque generated by the propeller rotation in high power outboard applications can make it hard to steer.

Big boats with displacement hulls and inboard or non power assisted stern drive engines, can generate high rudder loads: in these cases a mechanical steering system will be inadequate and we suggest the use of an Ultraflex hydraulic steering system.

We always recommend consulting qualified personnel when selecting, installing and maintaining a steering system for your boat.

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ADVANTAGES OF A PLANETARY GEAR DESIGN

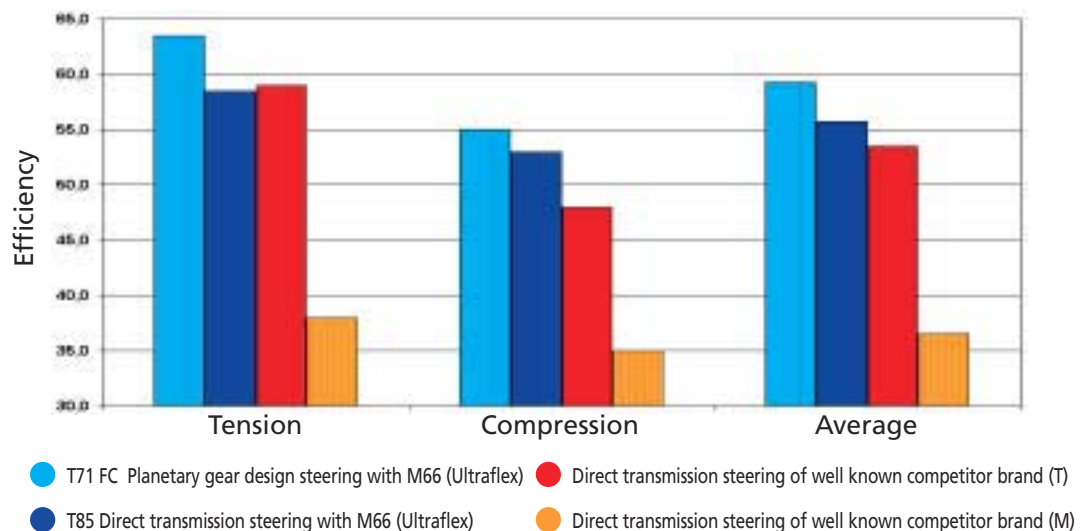


Ultraflex mechanical steering helms T71 FC, T73 NRFC as well as dual cable versions and tilt wheel versions use a Planetary Gear Design. A Planetary Gear Design has three satellite gears that rotate on their axis and at the same time rotate around the central helm axis. This allows for equal distribution of engine torque over three points of the central gear, dividing and balancing the system loads. The benefits of this special design are increased system longevity, increased efficiency and less engine feedback compared to single pinion gear helms.

EFFICIENCY COMPARISON TESTS

Test configuration:
3 bends at 90°; 1000N load

NOTE: indicated figures have been obtained after 500 cycles of running from samples bought from after-market sources



THE IMPORTANCE OF A NON-REVERSIBLE STEERING SYSTEM FOR INCREASED SAFETY

The steering system of a boat is the mechanism that determines the boat direction when the steering wheel is turned.

If, for any circumstance, the driver does not hold the steering wheel, a dangerous situation may occur caused by a sudden change of direction of the boat due to external forces (waves, currents, etc.) or internal forces such as rudder torque originated by the way of rotation of the propeller.

Engine torque usually generates a load on the steering system that must be continually compensated for by the driver even when the boat is going straight. The additional effort by the driver to maintain a true course can often cause fatigue.

With **Ultraflex Non-Reversible** steering helms T73NRFC, T74NRFC, T83NRFC, T84NRFC the loads applied to the steering system are no longer a problem. A special patented device allows the helm shaft to lock until turned by the driver, maintaining the boat direction and neutralizing the feedback loads on the steering cable.

This mechanism is engaged when the driver is not turning the wheel and is automatically disengaged as soon as the driver applies pressure on the wheel to change direction of the boat.

The **Ultraflex Non-Reversible** mechanism makes driving a boat safer and easier.

USE AND MAINTENANCE

The steering cable must be installed avoiding excessive and/or tight bends. This will provide the driver with easy handling at all speeds, helping to reduce system inefficiency, and excess play in the system.




Marine corrosion may cause the materials to deteriorate affecting maneuvering efficiency and in the worst case, system failure. By following the engine manufacturer specifications, the steering cable end fittings and the engine cable support must be cleaned and greased periodically; these simple operations minimize wear and corrosion in the system.

The steering cable must be regularly inspected. If steering becomes hard, inconsistent, cuts on the conduit surface are noticed, or any other component found damaged, the cable must be replaced immediately.

When storing your boat for an extended period of time we recommend removing the steering cable end fitting from its engine side support and cleaning it adequately.



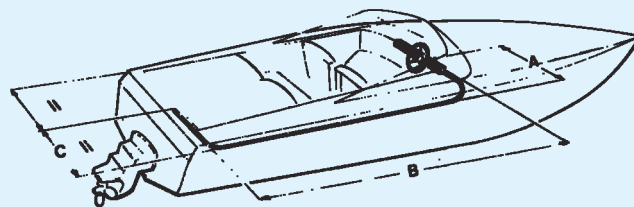
SELECTION OF STEERING SYSTEM AND CABLE LENGTH MEASUREMENT

APPLICATION	BOAT LENGTH	STEERING SYSTEM	
OUTBOARD 	up to 30' (9m)	T71FC - T81FC T73NRFC - T83NRFC - T86 - T88NR T96 - T98NR	Twin cable systems are recommended for boats that exceed 50 mph. Always follow engine manufacturer's instructions.
INBOARD 	up to 35' (10.5m)	T71FC - T81FC - T73NRFC - T83NRFC - T86 - T88NR T96 - T98NR	
STERNDRIVE POWER ASSISTED 		T71FC - T81FC - T73NRFC - T83NRFC - T86 - T88NR T96 - T98NR	

NOTE: sterndrive engines not equipped with power steering can create very high steering loads. Our hydraulic steering systems are recommended for these type of boats. For any further information please contact our Technical Service Department.

- Speed, hull, horsepower, engine type, displacement and size are major factors in boat performance and handling characteristics. The above selection guide should be used as a general reference only.
- One of the major factors in selecting a steering system is proper cable length. Due to specific routing in each boat, these approximate lengths will vary. Final selection should be made with the assistance of a qualified technician.
- Ultraflex mechanical steering systems should not be used on boats equipped with engines that exceed the maximum horsepower rating of the boat.

HOW TO MEASURE FOR NEW STEERING CABLE INSTALLATION



Add the lengths of A + B + C together and subtract 4" (10 cm) for each 90° bend.
Add 12" (30,5 cm) for the engine tilt tube.
To order in foot length, round up to the nearest whole foot.

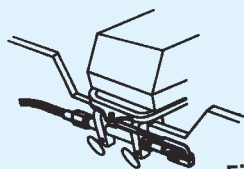


Fig. 1

TILT TUBE MOUNTING - Fig. 1

Example:
A (2.5') + B (10.5') + C (3') = 16'
16' - 8" (two 90° bends) = 15'4"
15'4" + 12" (tilt tube) = 16'4"
Round up to 17'

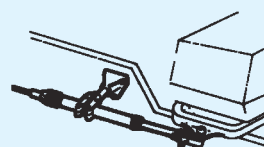


Fig. 2

TRANSOM SUPPORT OR SPLASHWELL MOUNTING - Fig. 2-3

Example:
A (2.5') + B (10.5') + C (3') = 16'
16' - 8" (two 90° bends) = 15'4"
Round up to 16'

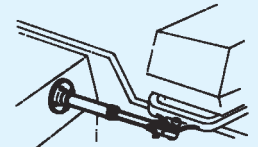
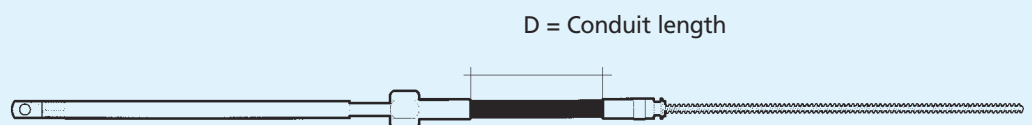


Fig. 3

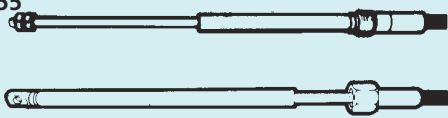


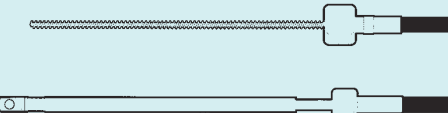



HOW TO MEASURE FOR REPLACEMENT STEERING CABLES



ORDER LENGTH: "D" dimension + 22" and round up to the next whole foot

Example: D= 120" + 22" = 142" (11'8"). Round up to 12 ft

REPLACEMENT STEERING CABLES

ULTRAFLEX REPLACEMENT CABLE	STEERING HELM	ADAPTOR REQUIRED
M55 	Ultraflex P15 - P22	none
	Teleflex® ATB RACK - SSC122	M55 AD
M66 	Ultraflex T71FC - T72FC - T73NR FC - T74NRFC - T81FC - T82FC - T83NR FC - T84NR FC Teleflex® Safe - TQC®/NFB® - Morse® D290	none
	Ultraflex year 2001 and prior: T71 - T72 - T73NR T74NR - T81 - T82 T83NR - T84NR	K66 - 38432Q 
M47 - DISCONTINUED USE M66 + K66 	Ultraflex year 2001 and prior: T71 - T72 - T73NR T74NR - T81 - T82 T83NR - T84NR	none
	Ultraflex T71FC - T72FC - T73NR FC - T74NR FC - T81FC - T82FC - T83NR FC - T84NR FC Morse® D290	K46-35679L 
	Teleflex® Safe - T® - Big-T®	none
M86 	Ultraflex G86 - G88NR G96 - G98NR Morse® Command 200 Teleflex® "THE RACK" SSC-124	none
	NOTE: Will not work with dual cable helms	
M68 + M67D 	Dual station steering systems: Ultraflex T71FC	none

Part numbers for ordering:

M55 XLL	LL = Length of cable
M66 XLL	LL = Length of cable
M47 XLL	LL = Length of cable
M86 XLL	LL = Length of cable
M68 XLL	LL = Length of cable
M67D XLL	LL = Length of cable



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PACKAGED STEERING SYSTEMS

ULTRAFLEX STEERING SYSTEM PACKAGED IN A BOX

A convenient kit form, especially suitable as replacement steering, that includes helm, bezel and cable.

The cable is available in 1-ft increments from 8 to 20 feet (specify cable length when ordering)

The wheel is not included

ROTECH™ ROTARY STEERING SYSTEM

- ROTECH - I XLL - LL= Length
- T 71FC - helm
- X 34 - 90° bezel
- M 66 - steering cable

- ROTECH - II XLL - LL= Length
- T72FC - helm-dual
- X 34 - 90° bezel
- M 66 - 2 steering cables

ACCURA™ ROTARY STEERING SYSTEM

- ACCURA - I XLL - LL= Length
- T73NR FC - helm
- X34 - 90° bezel
- M66 - steering cable

- ACCURA - II XLL - LL= Length
- T74NR FC - helm - dual
- X34 - 90° bezel
- M66 - steering cable

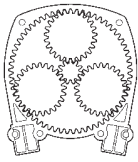
RACKTECH™ RACK AND PINION S. SYSTEM

- RACKTECH XLL - LL= Length
- M86 - preassembled helm with steering cable
- G86 - shaft assembly
- X 34 - 90° bezel

ACCUTECH™ RACK AND PINION S. SYSTEM

- ACCUTECH XLL - LL= Length
- M86 - preassembled helm with steering cable
- G88NR® - non-reversible shaft assembly
- X34 - 90° bezel





**FEATURING
PLANETARY GEAR
DESIGN**

T71FC AND T72FC ROTARY STEERING SYSTEMS

A COMPLETE STEERING SYSTEM CONSISTS OF:

- Steering helm:
 - T71FC - 38867 H - single cable steering helm
 - T72FC - 38868 K - dual cable steering helm
- Black mounting bezel:
 - X34 - 36654 B - 90° mounting
 - X35 - 36655 C - 20° mounting
- Steering cable: **M66** (Note: two M66 are needed with the T72FC system)
- Optional steering wheel (see index)
- Engine connection kits (see index)

FEATURES AND TECHNICAL SPECIFICATIONS

- Fast connect, simple installation
 - All stainless steel cable output ends
 - Corrosion resistant materials
 - Particular suitable where clearance is limited
 - Optional 90° or 20° installation
 - Standard 3/4" tapered shaft
 - Lock-to-lock steering wheel turns: approx. 3,8
 - Stroke: 9" (228 mm)
 - Maximum allowable steering wheel diameter: 16" (406 mm)
 - Minimum steering cable bend radius: 7.9" (200 mm)
 - Minimal feedback
 - Compact for mounting
 - T71FC and T72FC steering systems are not to be used on boats equipped with engines that exceed the maximum horsepower rating of the boat
 - For boats faster than 50 mph the twin cable steering system T72FC is recommended
 - T71FC and T72FC steering systems are also available in package with ROTECH (see page 10)
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- Exceeds EN 28848 safety standards
 - Exceeds ABYC P17 safety standards



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T71FC



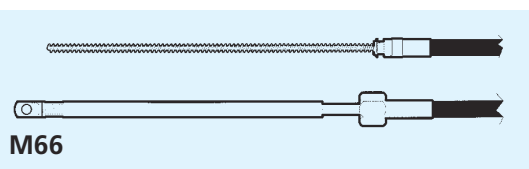
T72FC



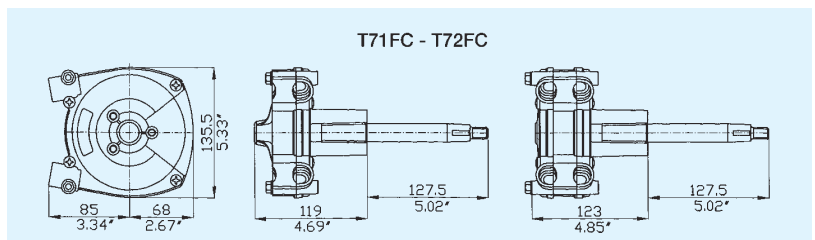
X34

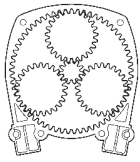


X35



M66





**FEATURING
PLANETARY GEAR
DESIGN**

T73NRFC® AND T74NRFC® NON-REVERSIBLE STEERING SYSTEMS

A COMPLETE STEERING SYSTEM CONSISTS OF:

- Steering helm:
 - T73NRFC - 38869 M
single cable steering helm
 - T74NRFC - 38870 W
dual cable steering helm
- Black mounting bezel:
 - X34 - 36654 B - 90° mounting
 - X35 - 36655 C - 20° mounting
- Steering cable: **M66** available in one foot increments (Note: two M66 are needed with the T74NRFC system)
- Optional steering wheel (see index)
- Engine connection kits (see index)

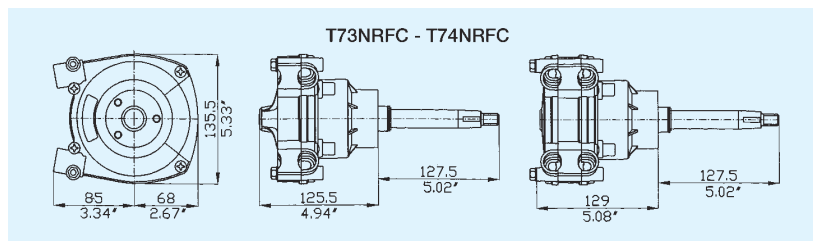
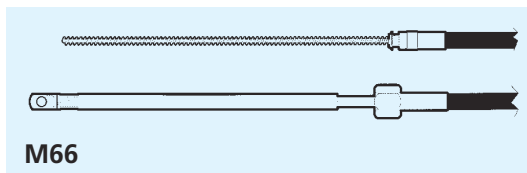
FEATURES AND TECHNICAL SPECIFICATIONS:

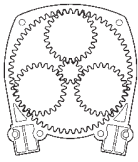
- Easy and safe steering : a **patented non-reversible mechanism** eliminates the continuous load on the operator caused by the propeller torque.
- Fast connect, simple installation
- Compact rotary helm unit: the central location of the steering shaft makes these systems the most compact in their class.
- Most suitable where clearance is limited.
- Ideal for larger outboards and surfacing propellers.
- Optional 90° or 20° installation
- Standard 3/4" tapered shaft.
- All stainless steel cable output ends.
- Made exclusively in corrosion resistant materials.
- Lock-to-lock steering wheel turns: approx 3,8
- Stroke: 9" (228 mm)
- Maximum allowable steering wheel diameter: 16" (406 mm)
- Minimum steering cable bend radius: 7.9" (200 mm)
- T73NRFC and T74NRFC steering systems are not to be used on boats equipped with engines that exceed the maximum horsepower rating of the boat.
- For boats faster than 50 mph the twin cable steering system T74NRFC is recommended
- Available in package with ACCURA (see page 10)
- Exceeds EN 28848 safety standards
- Exceeds ABYC P17 safety standards



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MECHANICAL STEERING SYSTEMS





**FEATURING
PLANETARY GEAR
DESIGN**

**T81FC - T82FC - T83NRFC®
- T84NRFC®
TILT STEERING SYSTEMS**

**A COMPLETE STEERING SYSTEM
CONSISTS OF:**

- Steering helm:
 - T81FC** - 38957 J
single cable steering helm
 - T82FC** - 38958 L
dual cable steering helm
 - T83NRFC** - 38959 N
non-reversible single cable steering helm
 - T84NRFC** - 38960 X
non-reversible dual cable steering helm
- Tilt mechanism:
 - X52** - 39250 U

NOTE: X52 Tilt mechanism fits also Ultraflex tilt mount rack and pinion steering systems (page 15) and Ultraflex hydraulic pumps UP28T, UP33T, UP39T (page 55)
- Steering cable: **M66** available in one foot increments (Note: two M66 are required for T82FC and T84NRFC systems)
- Optional steering wheel (see index)
- Engine connection kits (see index)

**FEATURES AND TECHNICAL
SPECIFICATIONS:**

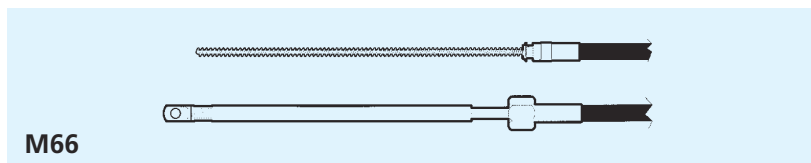
- Tilt range of 48° and five locking positions
- Fast connect, simple installation
- Tilt device eliminates underdash movement
- Standard 3/4" tapered shaft.
- All stainless steel cable output ends
- Corrosion resistant materials
- Lock-to-lock steering wheel turns: approx. 3,8
- Stroke: 9" (228 mm)
- Maximum allowable steering wheel diameter: 16" mm (406 mm)
- Minimum steering cable bend radius: 7.9" (200 mm)
- T81FC, T82FC, T83NRFC and T84NRFC steering systems are not to be used on boats equipped with engines that exceed the maximum horsepower rating of the boat.
- For boats faster than 50 mph the twin cable steering systems T82FC and T84 NRFC are recommended
- Exceeds EN 28848 safety standards
- Exceeds ABYC P17 safety standards



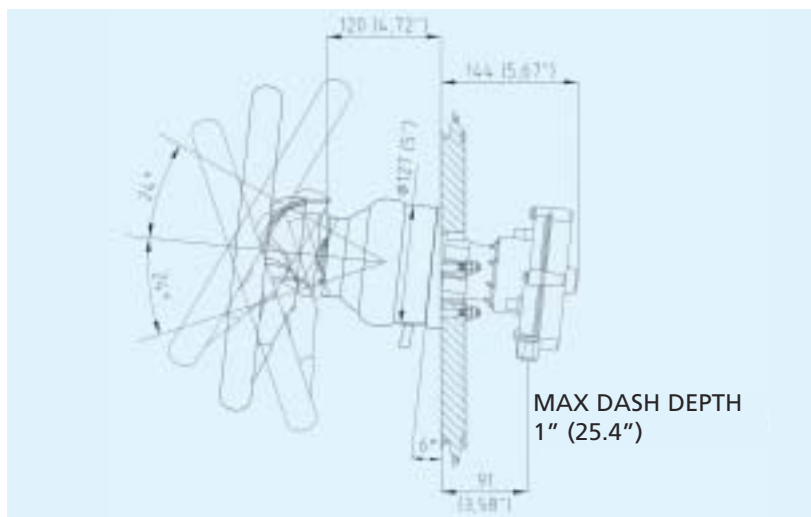
T81FC with X52



X52



M66





T86 AND T88NR® RACK AND PINION STEERING SYSTEMS

A COMPLETE STEERING SYSTEM CONSISTS OF:

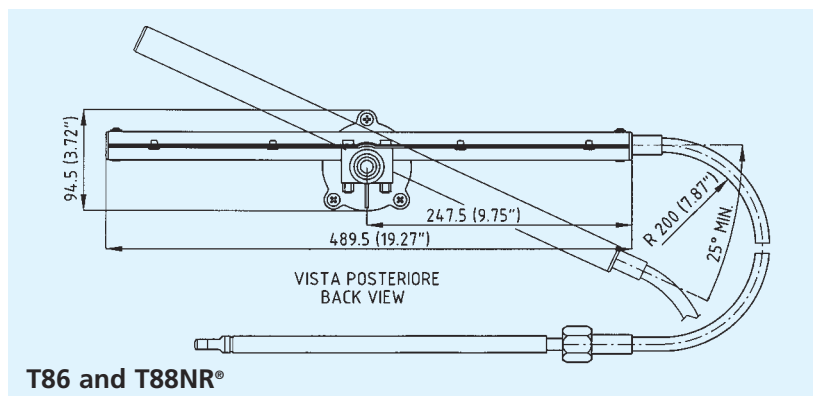
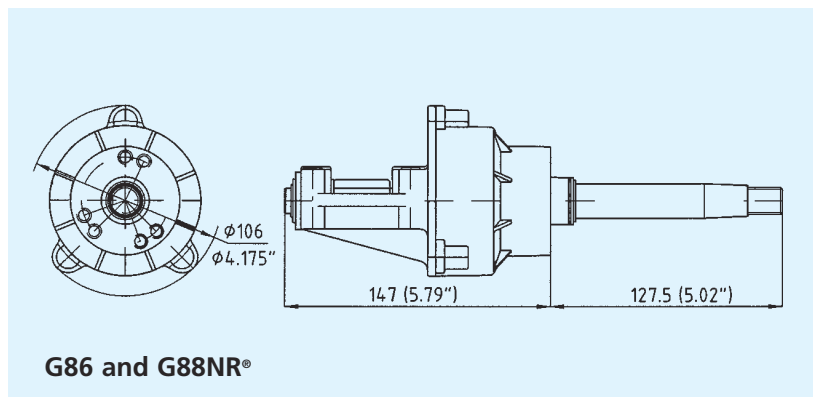
- Preassembled helm with steering cable:
TM86
- Helm assembly:
G86 - 39418 G standard
G88NR® - 39419 J - non reversible
- Black mounting bezel:
X34 - 36654 B - 90° mounting
X35 - 36655 C - 20° mounting
- Optional steering wheel (see index)
- Engine connection kits (see index)

FEATURES AND TECHNICAL SPECIFICATIONS:

- Easy and safe steering: patented non reversible G88NR helm eliminates the continuous load on the operator caused by the propeller torque.
- All stainless steel cable output ends
- Made exclusively in corrosion resistant materials.
- Optional 90° or 20° installation
- Standard 3/4" tapered shaft
- Lock-to-lock steering wheel turns: 3,5
- Stroke: 8.2" (210 mm)
- Maximum allowable steering wheel diameter: 16.5" (420 mm)
- Minimum steering cable bend radius: 7,9" (200 mm)
- T86 and T88 NR steering systems are not to be used on boats equipped with engines that exceed the maximum horsepower rating of the boat
- Available in package with RACKTECH and ACCUTECH (page 10)
- Exceeds EN 28848 safety standards
- Exceeds ABYC P17 safety standards



G86 and G88NR®



new

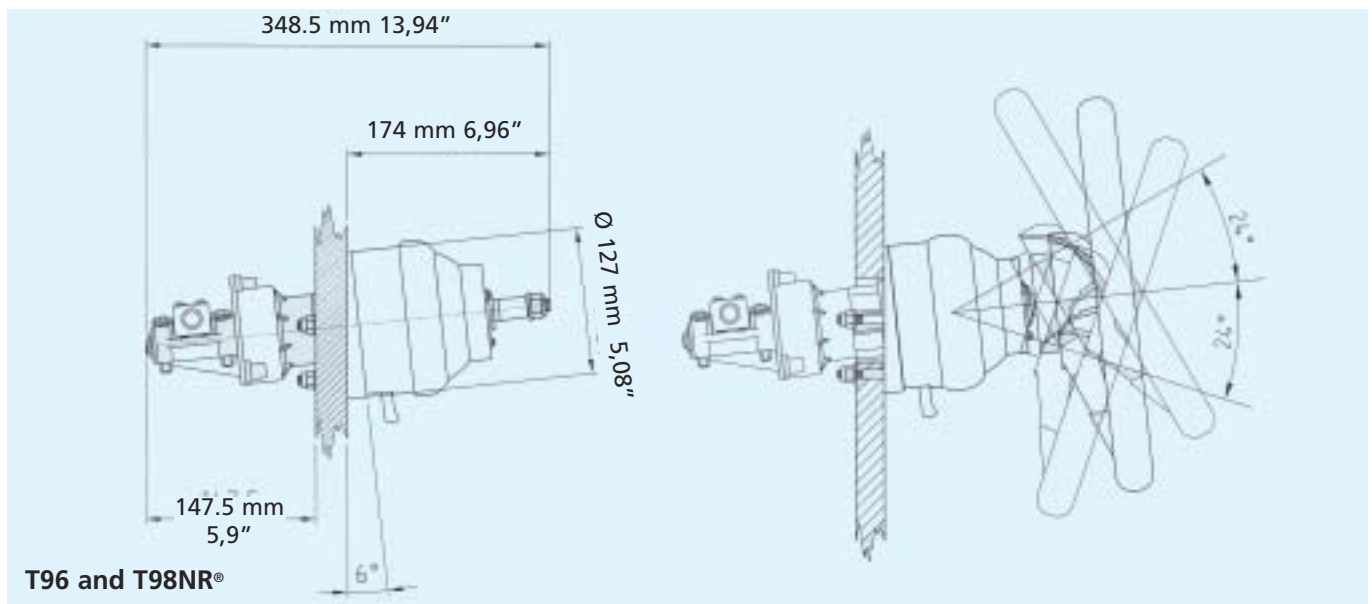
T96 AND T98NR® RACK AND PINION TILT STEERING SYSTEMS

A COMPLETE STEERING SYSTEM CONSISTS OF:

- Preassembled helm with steering cable:
TM86
- Helm assembly:
G96 - 39650 L standard
G98NR® - 39649 C non reversible
- Tilt mechanism:
X52 - 39250 U
NOTE: X52 Tilt mechanism fits also Ultraflex tilt mount rotary steering systems (page 13) and Ultraflex hydraulic steering pumps UP28T, UP33T and UP39T (page 55)
- Optional steering wheel (see index)
- Engine connection kits (see index)

FEATURES AND TECHNICAL SPECIFICATIONS:

- Easy and safe steering: the patented non reversible G98NR helm eliminates the continuous load on the operator caused by the propeller torque
- Fast, simple installation
- Tilt range of 48° and five locking positions
- Tilt device eliminates underdash movement
- Standard 3/4" tapered shaft.
- All stainless steel cable output ends
- Made exclusively in corrosion resistant materials.
- Lock-to-lock steering wheel turns: 3,5
- Stroke: 8.2" (210 mm)
- Maximum allowable steering wheel diameter: 16.5" (420 mm)
- Minimum steering cable bend radius: 7.9" (200 mm)
- T96 and T98NR® steering systems are not to be used on boats equipped with engines that exceed the maximum horsepower rating of the boat
- Exceeds EN 28848 safety standards
- Exceeds ABYC P17 safety standards





P15 - P22 STEERING SYSTEMS FOR INFLATABLE BOATS

A COMPLETE STEERING SYSTEM CONSISTS OF:

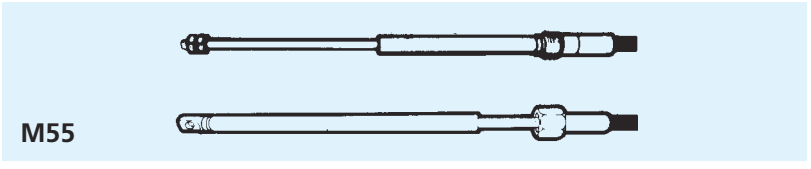
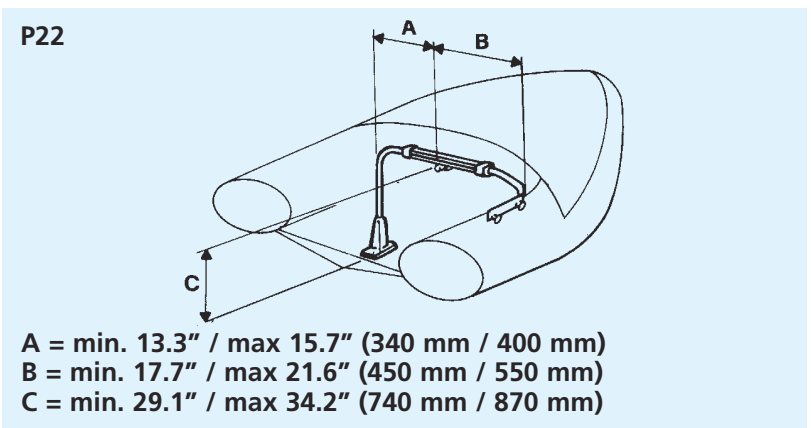
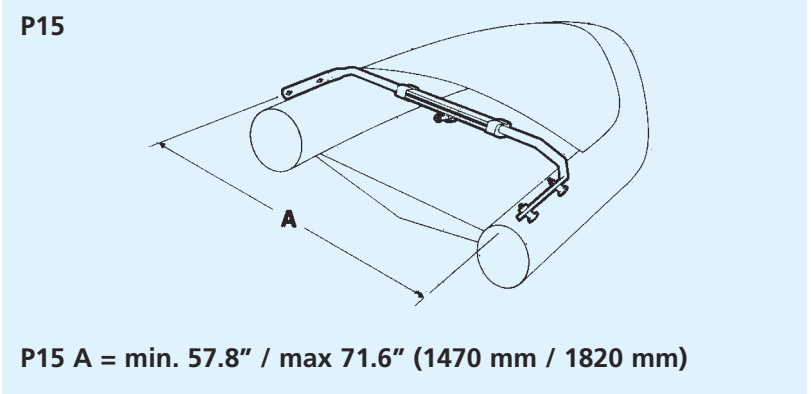
- Rack and pinion system with telescopic support tubes:
P15 - 33392 Z - lacing cuff anchors
or
P22 - 35346 O - floor and lacing cuff anchors
- Steering cable:
M55 available in one foot increments
- Optional steering wheel (see index)
- Accessories: control box mounting plates and connection kits (see index)

FEATURES AND TECHNICAL SPECIFICATIONS:

- Anodized alloy telescopic support
- All stainless steel cable output ends
- Lock-to-lock steering wheel turns: approx. 2,5
- Stroke: 9"(230 mm)
- Maximum allowable steering wheel diameter: 15" (380 mm)
- Minimum steering cable bend radius: 7.9"(200 mm)

- Exceeds EN 28848 safety standards
- Exceeds ABYC P17 safety standards

- APPLICATION: for use with inflatable boats equipped with outboard engines



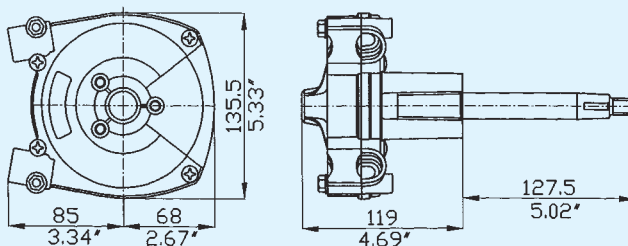
P34 STEERING SYSTEM FOR INFLATABLE BOATS

A COMPLETE STEERING SYSTEM CONSISTS OF:

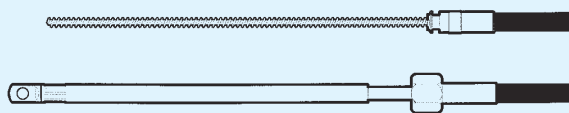
- Stainless steel, tubular, floor mounted pedestal:
P34 - 36657 E
- Steering helm (optional):
T71FC - 38867 H
- Black mounting bezel (optional):
X34 - 36654 B
- Steering cable:
M66 available in one foot increments (optional)
- Optional steering wheel (see index)
- Accessories: control box mounting plates and connection kits (see index)

FEATURES AND TECHNICAL SPECIFICATIONS:

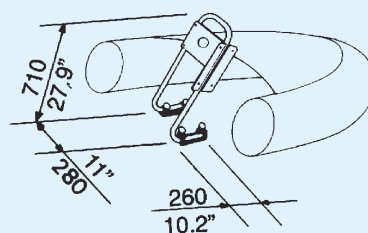
- Inflatable boats floor anchors
 - Stainless steel tubular support with anodized aluminum control box mounting plate
 - All stainless steel cable output ends
 - Lock-to-lock steering wheel turns: 3,8
 - Stroke: 9" (230")
 - Maximum allowable steering wheel diameter: 16" (406 mm)
 - Minimum steering cable bend radius: 7.9" (200 mm)
- Exceeds EN 28848 safety standards
 - Exceeds ABYC P17 safety standards
- APPLICATION: for use with inflatable boats equipped with outboard engines



T71FC



M66

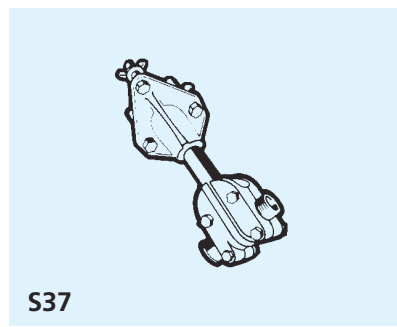




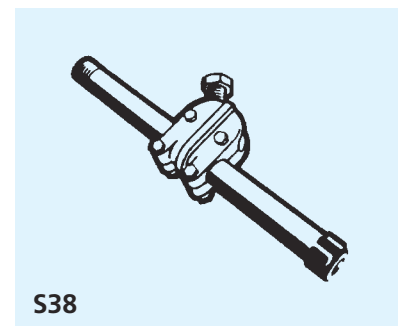
ACCESSORIES FOR STEERING SYSTEMS

STEERING CABLE SUPPORTS

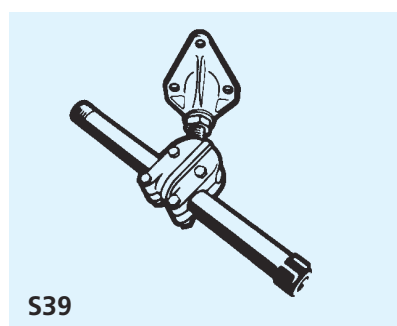
- S37 - 31848 M Clamp block
- S38 - 31971 M Stringer mount clamp block in marine aluminum and stainless steel
- S39 - 31916 F Clamp block in marine aluminum and stainless steel
- S40 - 31917 G Splashwell mounting, corrosion resistant
- S39T - 53930 J Tube only for S39
- S40T - 53935 O Tube only for S40
- OMC® TT - 39363 H Thru transom sterndrive steering kit applicable for OMC® sterndrives manufactured from 1968-1982. Connects standard mechanical steering cable to the transom and sterndrive.



S37



S38



S39



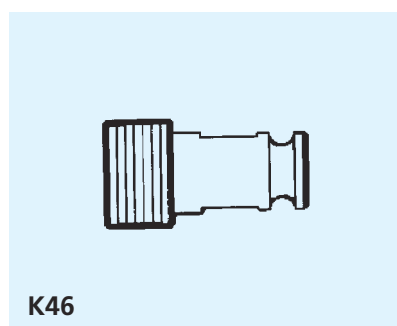
S40



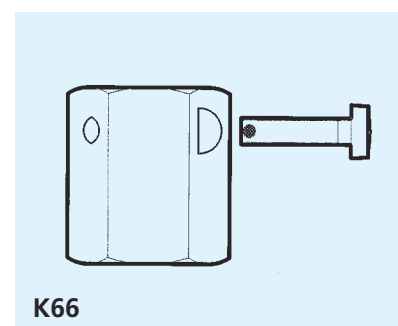
OMC-TT

STEERING CABLE ADAPTORS

- K46 - 35679 L Adapts M47 cable to Morse® D290® helm
- K66 - 38432 Q Adapts M66 cable to threaded helms



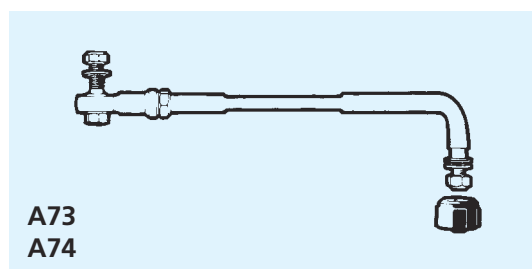
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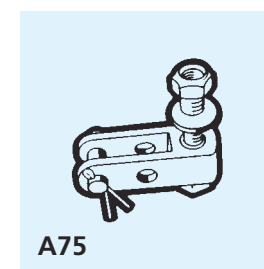
K66

ENGINE CONNECTION KITS

- A73 - 32637 T Tiller arm for Mercury® engines
- A74 - 32638 W Tiller arm for Johnson®, Evinrude®, OMC®
- A75 - 34459 X Clevis



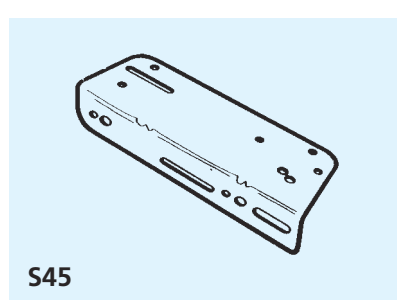
A73
A74



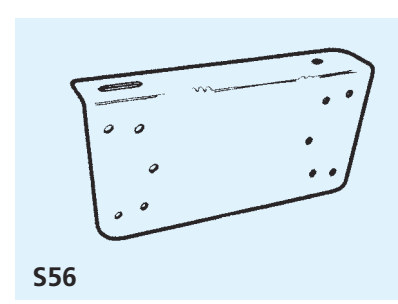
A75

CONTROL BOX SUPPORT BRACKETS FOR P15 - P22 STEERING SYSTEMS

- S45 - 32797 P Designed for B47 and B49 control boxes
- S56 - 35062 F Designed for single lever control boxes. To be positioned on the lacing cuff.



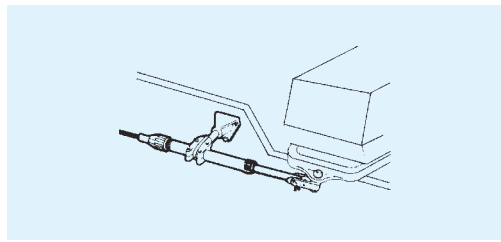
S45



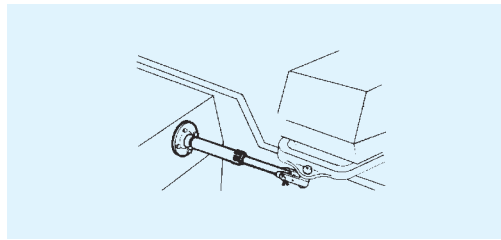
S56

ACCESSORIES FOR STEERING SYSTEMS

Installation	Cable Support + engine connection kit
A	S39 or S61 or S62 + A75
B	S40 + A75

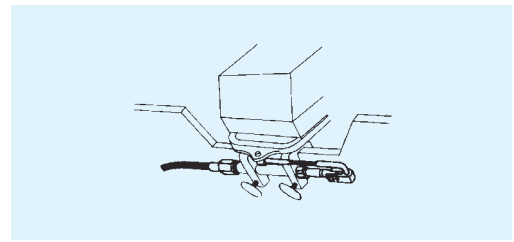


A = With clamp block

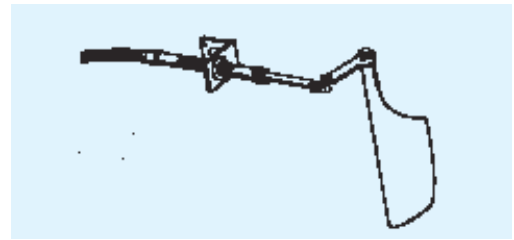


B = With splashwell

Installation	Cable Support + engine connection kit
C	A73 or A74
D	S55 + A75



C = With tiller arm



D = With 90° rudder support

TYPICAL INSTALLATIONS

A87 - TIE BAR FOR TWIN OUTBOARD ENGINES

A87 - 39937 H

Tie bar for simple hook up of twin outboard engines.

- Adjustable to 31" (78 cm) centers.
- Stainless steel makes this kit corrosion resistant.

SUITABLE FOR THE FOLLOWING ENGINES:

- Yamaha 115-225 1984 and newer
- Johnson-Evinrude 50-235 hp
- Mercury 40-225 hp
- Mariner 40-225 hp
- Suzuki 150-150 SS-200 hp and newer



WYRE TYPE STEERING GROMMETS AND RINGS

BLACK GROMMETS

- R1 B - 38060 I - Large
Ø 6" (152 mm); h 4.3" (110 mm)
- R2 B - 38061 J - Small
Ø 4.1" (105 mm); h 2.5" (65 mm)
- R3 B - 38062 K - 2 holes
Ø 4.1" (105 mm); h 2" (52 mm)



WHITE GROMMETS

- R1 W - 38953 A - Large
Ø 6" (152 mm); h 4.3" (110 mm)
- R2 W - 38954 C - Small
Ø 4.1" (105 mm); h 2.5" (65 mm)
- R3 W - 38955 E - 2 holes
Ø 4.1" (105 mm); h 2" (52 mm)

