ENGINE CONTROLS

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BLA boatinglifestyleadventure

Mechanical Engine Controls at a Glance

Controls	B700	700SD	B700SM	B700SS	CH2800 CH2850	CH7500	CH1700	SL-3 TOP MNT
Function: D (dual) S (single)	**D**	**D**	**D**	**D**	**D**	**D**	**D**	**D**
Boat Type								
Outboard & Sterndrive Single Station	Y+	Y+	Y+	Y	Y	Y+	Y+	Y+
Outboard & Sterndrive Dual Station	Y	Y	Y	Y	Y	Y	Y	Y
Inboard Single Station	Y	Y	Y+	Y	Y	Y	Y	Y
Inboard Dual Station	Y	Y	Y	Y	Y	Y	Y	Y
Jet Boat	N	N	N	N	N	N	N	N
Sail Boat	Y	Y	Y	Y+	Y+	Y	Y	Y
Commercial	Y	N	Y	Y	Y	Y	Y	Y
Control Features								
Neutral Safety Switch	O	O	O	O	N	Y	Y	Y
Neutral Interlock	N	N	N	N	N	N	N	Y
Engine Warm-Up Provision	Y	Y	Y	Y	Y	Y	Y	Y
Adjustable Throttle Brake	Y	Y	Y	Y	Y	Y	Y	Y
Trim & Tilt Switch	O	O	N	N	N	O	O	O
Detents	Y	Y	Y	Y	Y	Y	Y	Y
Thruster/Windlass Control	N	N	N	N	O	N	N	N
Max Number of Engines	2	1	1	1	1	1	1	2
Cables								
30 Series	Y	Y	Y	Y	Y	Y	Y	Y
Merc/Marine® 600A & 630 Type	N	N	N	N	N	Y	Y	Y
Evinrude®/Johnson® 479 Type	N	N	N	N	N	Y	Y	Y
40 Series	N	N	N	N	N	N	N	N
Merc Gen II	N	N	N	N	N	Y	Y	Y

** Single Engine only + Most popular application D0499: D series control uses D0499 cables only N: N/A Y: Yes O: Optional*

What to consider when selecting controls

Dual Function Controls:

Dual function controls operate both gear shift and throttle
with a single lever. The control mechanism still uses two cables (one for gear and one for throttle), but movement of both cables and control of gear and throttle is achieved through just one lever.

Dual function controls are also available for twin engine applications. Although there are two levers on the control, there is still only one lever controlling both shift and throttle for each individual engine.

Dual function controls helped make boats so much easier to handle that it has become the most popular control used today. Not only do dual function controls have a very natural distinctive action, but shifting is very quick and they can only be shifted at low RPM which protects the engine's shift mechanism.

Single Function Controls:

On single function controls, one lever operates only the gear shift mechanism or only the throttle. The controls themselves may have one lever (which would control the shift or the throttle) or two levers (one for gear and one for throttle).

Twin engine applications will utilise two, twin lever single function controls. Commonly both levers of one control will operate the throttles, while the levers of the second control will operate gear shift.

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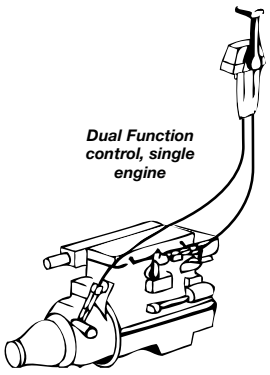
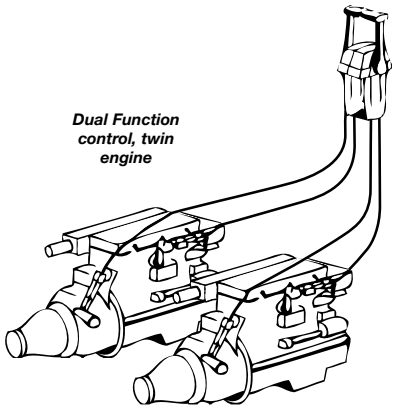
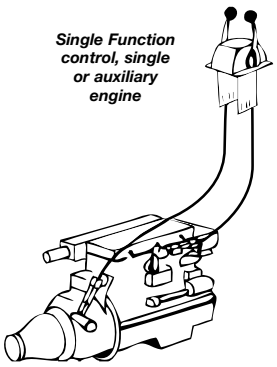


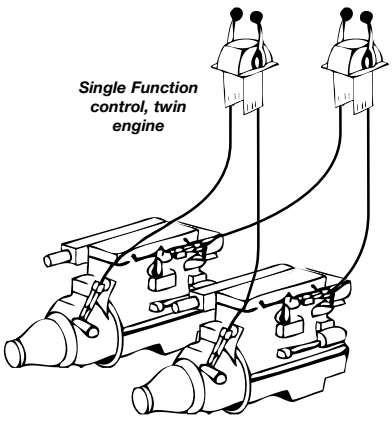
Dual Function control, single engine



Dual Function control, twin engine



Single Function control, single or auxiliary engine



Single Function control, twin engine

SL-3 SIDE MNT	MV-3	KB	SLT	MT-3	S	SR	NB	ST	CH4400	D
D	D	S	S	D	S	S	S	S	S	S
Y+	Y	Y	Y	Y	Y	Y	Y	N	Y	N
Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N
Y	Y	Y	Y	Y+	Y	Y	Y	Y	Y	Y
Y	Y	Y+	Y+	Y+	Y	Y+	Y	N	Y+	Y
N	Y+	N	N	N	N	N	N	N	N	Y+
Y	Y	Y	Y	Y	Y	Y	Y	N	N	N
Y	Y	Y	Y	Y+	Y+	Y	Y+	Y+	Y	Y+
Y	O	N	O	O	O	O	N	N	O	N
Y	Y	N	N	N	N	N	N	N	N	N
Y	Y	N	N	Y	N	N	N	N	N	N
Y	N	Y	N	N	Y	Y	Y	N	Y	N
O	N	N	N	N	N	N	N	N	N	N
Y	Y	Y	Y	Y	O	O	Y	N	O	N
N	N	N	N	N	N	N	N	N	N	N
1	1	1	1	2	1	1	1	1	1	1
Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	D0499
Y	N	N	N	N	N	N	N	N	N	N
Y	N	N	N	N	N	N	N	N	N	N
N	N	N	N	N	O*	O	O	Y	O	N
Y	N	N	N	N	N	N	N	N	N	N

Multiple Station Installations

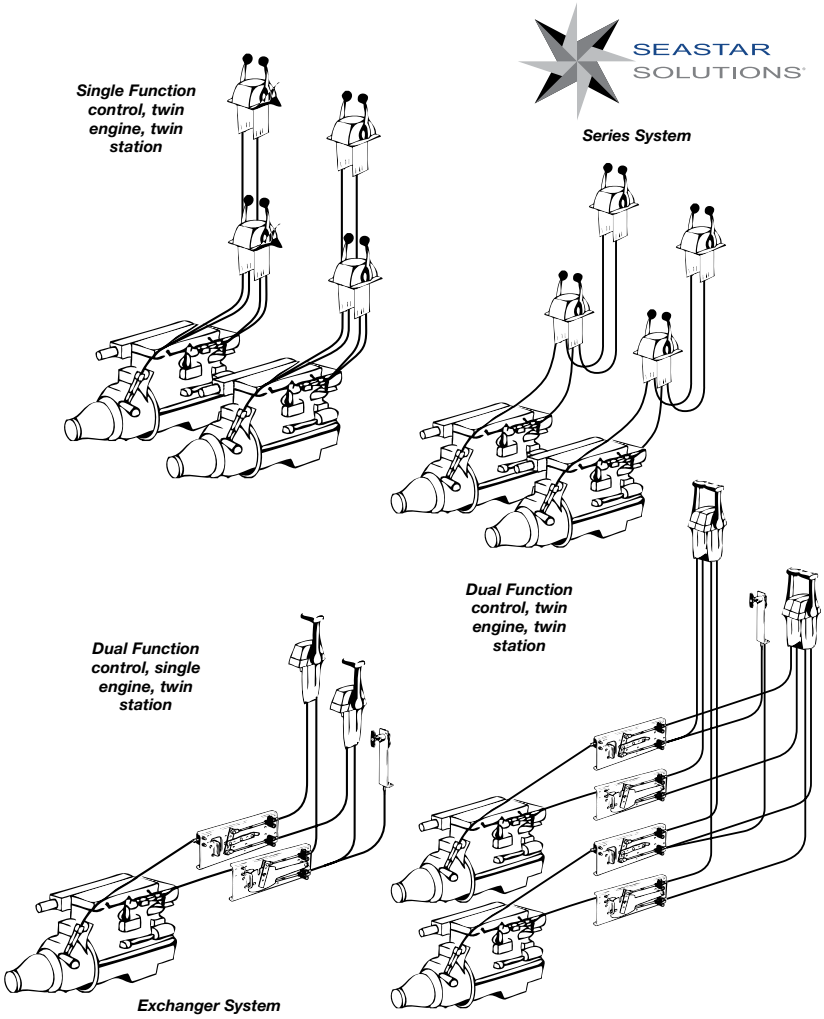
Single Function Parallel Control System
Cables from each control station run all the way to the gear and throttle at the engine. This configuration is sometimes used when cable runs are relatively short and direct.

Single Function Series Control System
Cables run from controls at the upper station to the lower station controls. A second set of control cables runs from the lower station to the engine. This method is generally used for longer or more difficult cable runs.

The choice to utilise a parallel or series system is dictated by the total degrees of bend in the cables as measured by the sum of the degrees of all bend radii. This directly affects the efficiency of cable action. The configuration that gives the control system the fewest degrees of bend is the one that should be employed.

Dual Function

When using dual function controls in dual station applications, it is necessary to isolate the two systems by the use of dual station exchangers, as it is not possible to back drive dual function controls. The system utilises a dual station unit for each engine function eg. throttle and gear shift. The gear control's dual station exchanger has a simple latching mechanism, controlled by a selector at the main station, which isolates the station not in use and prevents inadvertent operation.



Top Mount Controls - B700

Dual Function Controls:

Available in single or dual lever, suitable for use with inboards with hydraulic gear boxes, outboards and stern drives.

Features:

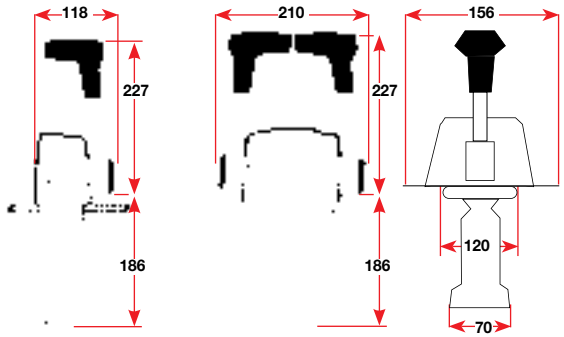
- Each lever operates both shift and throttle (two levers for two engines)
- Easy distinctive action with positive detent for shifts
- Adjustable throttle friction
- Push button disengagement of shift for neutral throttle warm up
- Can only shift at low RPM thereby protecting gearbox
- Optional trim/tilt control
- Dual station capability (requires exchangers - refer page 837)
- Optional neutral safety switch to ensure engine start can only occur when in neutral

Cables:

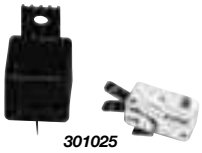
Accepts universal 30/33 series cables, CC230, CC330, CC332, CX632 and CCX633.

Materials:

- Die-cast zinc alloy frame
- Gold passivated steel link plates
- High impact ABS dress covers



BLA Code	Description
301002	Dual lever standard control
301003	Dual lever control with trim and tilt
301006	Single lever standard control
301007	Single lever control with trim and tilt



Accessories:

301025 Optional neutral safety switch

Side Mount Control - 700SD

Dual Function Control:

Side mount outboard style single lever control, suitable for use with outboards and stern drives, but can be used with inboards with hydraulic gearboxes.

Features:

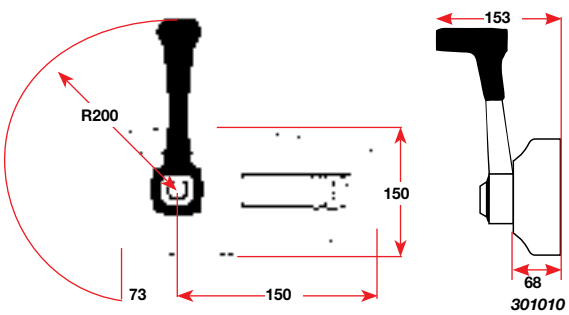
- Lever operates both shift and throttle
- Surface mounts horizontally or vertically on port or starboard
- Easy distinctive action with positive detent for shifts
- Adjustable throttle friction
- Push button disengagement of shift for neutral throttle warm up
- Can only shift at low RPM thereby protecting gearbox
- Dual station capability (requires exchangers - refer page 837)
- Optional neutral safety switch to ensure engine start can only occur when in neutral

Cables:

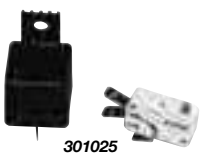
Accepts universal 30/33 series cables, CC230, CC330, CC332, CX632 and CCX633.

Materials:

- Die-cast zinc alloy frame
- Gold passivated steel link plates
- High impact ABS dress covers



BLA Code	Description
301010	Standard control lev O/B
301011	Control lev tilt



Accessories:

301025 Optional neutral safety switch

Top Mount Control - SLT

Single Function Control:

There's nothing else like it. Patented self locking throttle technology makes SLT (Self Locking Throttle) the only control that stops throttle creep in single and multi stations without making the control stiff like traditional friction based throttle solutions.

Suitable for inboards with hydraulic gearboxes, stern drives and outboards.

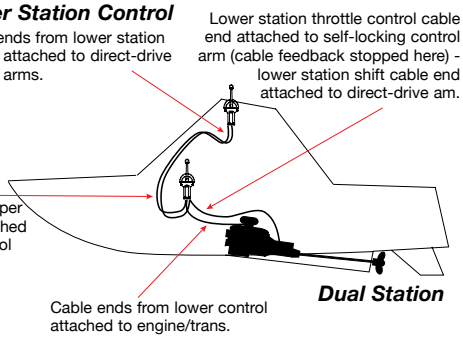
How it Works:

- Each lever has both direct-drive and self-locking cable connection arms
- Use self-locking arm for master station-to-engine throttle cables; direct-drive arm for shift and station-to-station cables
- Better than traditional friction-based solutions, the SLT doesn't rely on tightening the control lever or restricting cable movement to stop creep
- Using a patented SLT clutch, the control maintains throttle lever position, even in vibration-prone environments and it's easy to move the lever when you're ready
- With the SLT, you can take full advantage of premium, high-efficiency cables for smooth lever operation, because cable movement is unrestricted. Yet, the SLT clutch will not allow vibration and cable feedback to move the lever
- Other controls allow the use of premium cables, but the extra advantage of a high performance cable is negated when a 'cable brake' is used to limit throttle creep. There is no 'positive stop' with a cable brake. You tighten it to achieve a trade-off between lever slippage and ease of movement. If it's too tight, the cable is hard to move. If it's too loose, the cable may feel fine but the throttle lever may creep
- Each SLT can be configured for Throttle and Shift, Twin Throttle or Twin Shift, simply by screwing in the appropriate throttle stops, detents and knobs that come with the control

301210

Features:

- Patented SLT technology prevents throttle creep without creating friction, lever stays where you leave it
- Superior twin station performance, both stations operate simultaneously
- Polished stainless steel levers and domed housing
- Independent shift and throttle action, one lever for shift, one lever for throttle
- Can be user configured as either push or pull to operate throttle and/or shift
- Adjustable/removable shift detents and throttle stops
- Optional neutral safety switch



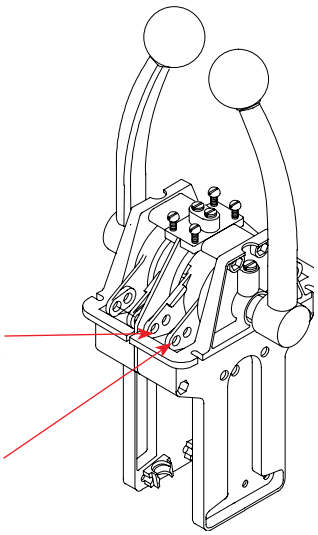
Cables:

Particularly suited to high efficiency cables such as CCX633 XTREME™

Also accepts universal 30/33 series cables, CC230, CC330, CC332 or CCX632.

Materials:

- Stainless steel visible above console
- Heavy duty die-cast zinc alloy mechanism
- Each control lever has both a self-locking and direct drive lever arm
- The cable from the engine throttle directly to the control is connected to the control's self-locking lever arm. The cable from the transmission is connected to the control's direct-drive lever arm. Cables between stations are only connected to the direct drive lever arms of those controls.



Direct Drive Lever Arm:

When a cable from the transmission or a "slave station" is connected to the direct-drive arm, it will allow the control lever to be moved from another station. Cables from the main station to any additional stations must be attached to direct drive arms on those stations.

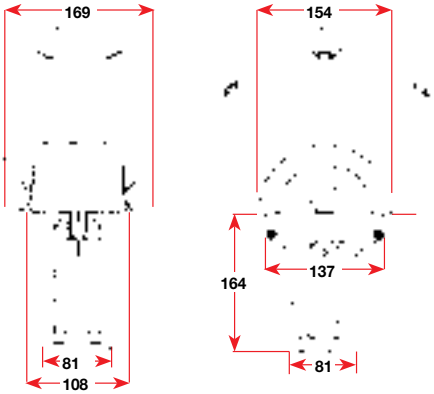
Self-Locking Lever Arm:

When a cable from the throttle is connected to the self-locking arm it will only move if the lever is moved; engine vibration and return spring feedback will not move the control lever. Only throttle cables routed directly from the engine to the control should be connected to self-locking lever arms.

BLA Code	Description
301210	SLT control

301222

301226



Accessories:

301226	Optional neutral safety switch
301222	Optional dual station kit
301232	Replacement knob red
301234	Replacement knob black

N.B. For extra steering station add an additional control 301210 for each engine and one dual station kit 301222 for each control

Side Mount Control - B700SM

Dual Function Control:

Side mount, single lever, compact control, suitable for use with outboards, stern drives and inboards with hydraulic gear boxes.

Features:

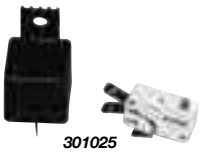
- Lever operates both shift and throttle
- Mounts horizontally or vertically on port or starboard
- Easy distinctive action with positive detent for shifts
- Adjustable throttle friction
- Push button disengagement of shift for neutral throttle warm up
- Can only shift at low RPM thereby protecting gearbox
- Dual station capability (requires exchangers - refer page 837)
- Optional neutral safety switch to ensure engine start can only occur when in neutral

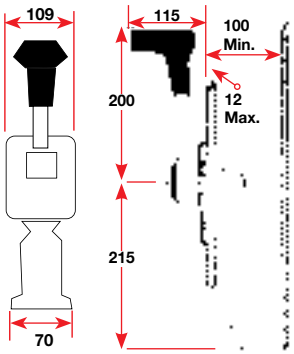
Cables:

Accepts universal 30/33 series cables, CC230, CC330, CC332, CX632 and CCX633.

Materials:

- Die-cast zinc alloy frame
- Gold passivated steel link plates
- High impact ABS dress covers





BLA Code	Description
301014	Standard control

Accessories:

301025 Optional neutral safety switch

Side Mount Control - B700SS

Dual Function Control:

Side mount single lever control, particularly suited to sail boats. Suitable for use with outboards, sail drives, small inboards with mechanical shift and larger inboards with hydraulic gearboxes.

Features:

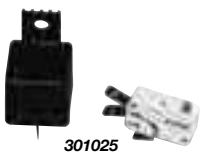
- Flush cockpit side mounting for sail boats
- Smooth control lever reduces the chance of sheets, halyards and clothing catching
- Lever operates both shift and throttle
- Mounts horizontally or vertically on port or starboard
- Easy distinctive action with positive detent for shifts
- Adjustable throttle friction
- Push button disengagement of shift for neutral throttle warm up
- Can only shift at low RPM thereby protecting gearbox
- Dual station capability (requires exchangers - refer page 837)

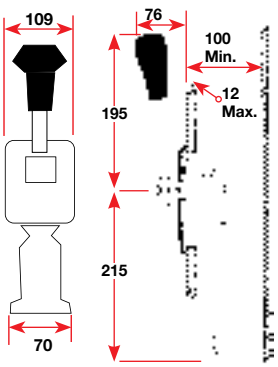
Cables:

Accepts universal 30/33 series cables, CC230, CC330, CC332, CX632 and CCX633.

Materials:

- Die-cast zinc alloy frame
- Gold passivated steel link plates
- High impact ABS dress cover





BLA Code	Description
301018	B700SS side mount control

Accessories:

301025 Optional neutral safety switch

Side Mount Controls - CH2800 & 2850

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Dual Function Controls:

A unique control offering optional three position twist switch for control of bow thruster or anchor winch. Can be mounted with or without cover plate. Suitable for inboards with hydraulic gearboxes, sail drives, stern drives and outboards.

Features:

- Operates both shift and throttle with one handle
- Positive detents in forward/neutral/reverse
- Push button disengagement for neutral warm up
- Can be left or right hand mounted
- Can only shift at low RPM thereby protecting gearbox
- Dual station capability (requires exchangers - refer page 837)
- Adjustable throttle friction

Cables:

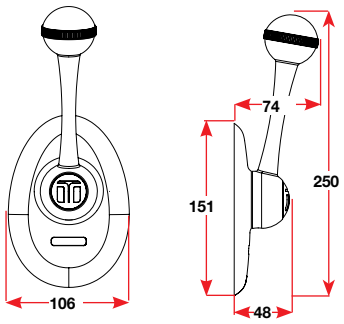
Accepts universal 30/33 series cables, CC230, CC330, CC332, CX632 and CCX633.

Materials:

- Stainless steel lever arm, composite knob, die-cast zinc alloy mechanism
- Gold passivated steel linkages

306782

306784
Shown without cover plate



BLA Code	Description
306782	CH2800 side mount control with knob switch
306784	CH2850 side mount control without knob switch

Top Mount Controls - CH7500

Dual Function Controls:

Single lever, right hand control designed with a focus on ergonomics. The result is a control that is robust yet feels natural in every function. Suitable for inboards with hydraulic gearbox, stern drives and outboards.

Features:

- Ergonomic designed handle
- Soft touch grip
- Precise, smooth, distinctive action with positive detents for shift
- Lever operates both shift and throttle
- Adjustable throttle friction
- Push button disengagement of shift for neutral throttle warm up
- Neutral safety switch to ensure engine start can only occur when in neutral
- Dual station capability (requires exchangers - refer page 837)
- **301029** includes trim control in handle

Cables:

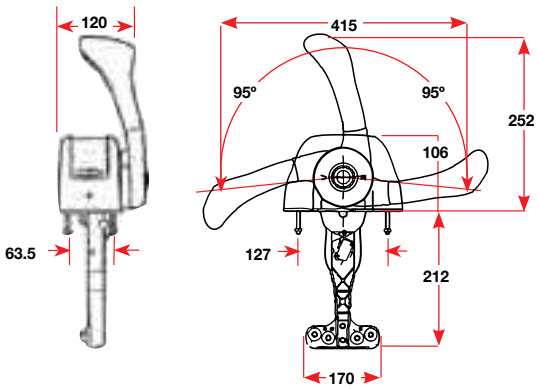
CCX633 XTREME™ recommended.
Also accepts universal 30/33 series cables, CC230, CC330, CC332 and CCX632, 479 type Evinrude®/Johnson® 600A type Mercury®/Mariner® 630 type Mariner® or CC189 Mercury®/Mercruiser® Gen II.

Materials:

- Powder-coated die-cast zinc alloy handle with tactile rubber grip
- ABS plastic and copolymer cover
- Die-cast zinc alloy mechanism with gold passivated steel linkage plates

BLA Code	Description
301028	CH7500 standard control
301029	CH7500 control with trim

301028



Side Mount Controls - CH1700

Dual Function Controls:

Single lever, right hand control designed with a focus on ergonomics. The result is a control that is robust yet feels natural in every function. Suitable for inboards with hydraulic gearbox, stern drives and outboards.

Features:

- Ergonomic designed handle
- Soft touch grip
- Precise, smooth, distinctive action with positive detents for shift
- Lever operates both shift and throttle
- Adjustable throttle friction
- Mechanism can be rotated relative to handle and cover plate to allow different cable entry angle
- Push button disengagement of shift for neutral throttle warm up
- Neutral interlock with thumb release button
- Neutral safety switch to ensure engine start can only occur when in neutral
- Dual station capability (requires exchangers - refer page 837)
- **301039** includes trim control in handle

Cables:

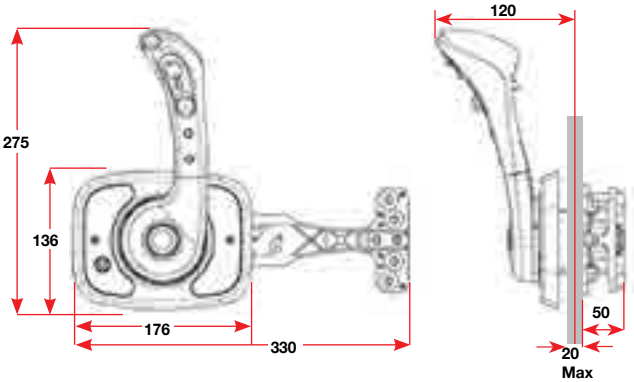
CCX633 XTREME™ recommended.
Also accepts universal 30/33 series cables, CC230, CC330, CC332 and CCX632, 479 type Evinrude®/Johnson®, 600A type Mercury®/Mariner®, 630 type Mariner® or CC189 Mercury®/Mercruiser® Gen II.

Materials:

- Powder-coated die-cast zinc alloy handle with tactile rubber grip
- ABS plastic and copolymer cover
- Die-cast zinc alloy mechanism with gold passivated steel linkage plates

BLA Code	Description
301038	CH1700 standard control
301039	CH1700 control with trim

301039



Side & Top Mount Controls - SL-3

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Dual Function Controls:

Attractive and extremely simple in design, the SL-3 is specifically engineered for installation without tedious cable adjustments. The controls are made to a modular design and are available in side mount or top mount versions, with or without engine trim and tilt switch. Suitable for inboards with hydraulic gearboxes, outboards and stern drives.

'Easy-On' Cable Design Means:

No shift or throttle adjustments.

Features:

- Operates both shift and throttle with one handle (two levers for two engines)
- Power trim and tilt switch located in handle grip (optional)
- Easy distinctive action with crisp detents in forward/neutral/reverse
- Neutral interlock trigger in handle, to prevent handle engaging gears accidentally
- Entire gear mechanism is enclosed and permanently lubricated for smooth long-lasting operation
- Push-in button for neutral throttle warm up
- Can only shift at low RPM thereby protecting gearbox
- Neutral safety switch incorporated as standard
- Dual station capability (requires exchangers - refer page 837)
- Suitable for exterior mounting

Side Mount Version Features:

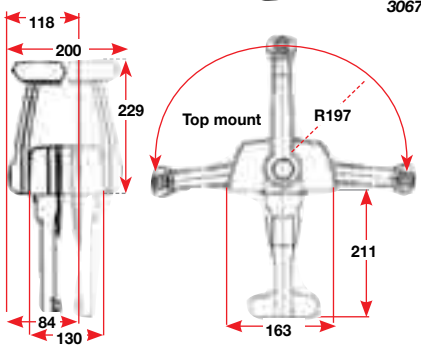
- Choice of cable entry through 360°
- Can be mounted left or right hand

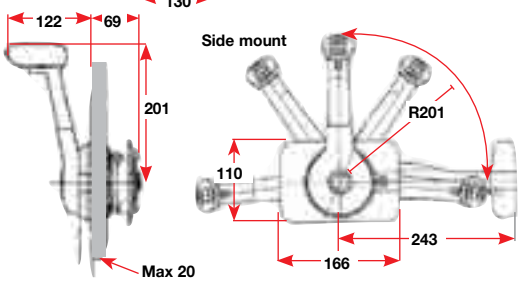
Cables:

Accepts universal 30/33 series cables, CC230, CC330, CC332, CX632 and CCX633, 479 type Evinrude®/Johnson®, 600A type Mercury®/Mariner®, 630 type Mariner® or CC189 Mercury®/Mercruiser® Gen II.

Materials:

- Die-cast zinc alloy mechanism and handles
- Gold passivated link plates
- U.V. stable plastic dress cover





BLA Code	Description
306720	Top mount single
306722	Top mount single with trim & tilt switch
306724	Top mount twin
306726	Top mount twin with trim & tilt switch
306728	Side mount single
306730	Side mount single with trim & tilt switch

Accessories:

309896 Optional neutral safety switch
309922 Replacement handle for **306720** & **306724**

Top Mount Controls - KB Series

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Single Function Control:

A compact and durable top mount control with modern design and functional characteristics. Suitable for inboards with hydraulic gearboxes, outboards and stern drives.

Features:

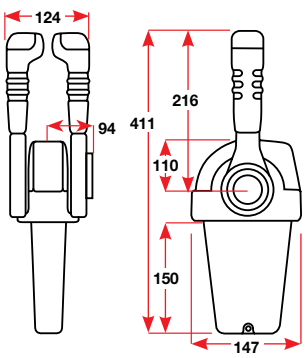
- Single function, single or twin levers
- One handle for gear, one handle for throttle
- Available as throttle only, or as gear and throttle
- The throttle brake, incorporated as standard, is simply applied by turning the knob at the base of the handle to the desired setting
- Can be used for dual station installations. Both stations move together, although care must be taken to avoid operating one station if the other is firmly dampened down. Extra fittings required for dual stations are listed below
- Detents for forward/neutral/reverse incorporated in control
- Plastic body and hanger plate with metal moving parts. Especially suitable for engines with heavy governor load (i.e. Gardner diesel)

Cables:

Accepts universal 30/33 series cables, CC230, CC330, CC332, CX632 and CCX633. Fittings for these cables supplied with control. KB controls will not accept 40/43 series cables.

Materials:

- Plastic body and hanger with enclosed die-cast zinc alloy and zinc plated metal mechanism
- Suitable for exposed installation



BLA Code	Description
306894	Single lever throttle control
306895	Twin lever throttle & gear control

Accessories:

306896 Dual station kit (per lever)

Side Mount Controls - MV-3

Dual Function Controls:

The MV-3 control is specifically designed to meet the requirements of ski boat enthusiasts. The neutral locking hand lever can only be disengaged from neutral by raising the lifter under the ball knob. When the neutral lock is disengaged the action from forward through to reverse is very smooth, a reason this control is also commonly used with sport jets. Suitable for use with inboards with hydraulic shift, outboards and sport jets.

Features:

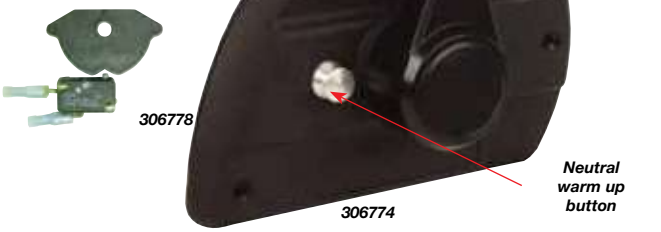
- Operates both shift and throttle with one handle
- Concealed side mounting
- Pull out gear disengagement for neutral warm up with automatic re-engagement
- Can be left or right hand mounted
- Optional neutral safety switch to ensure engine start can only occur when in neutral.

Cables:

Accepts universal 30/33 series cables, CC230, CC330, CC332, CX632 and CCX633.

Materials:

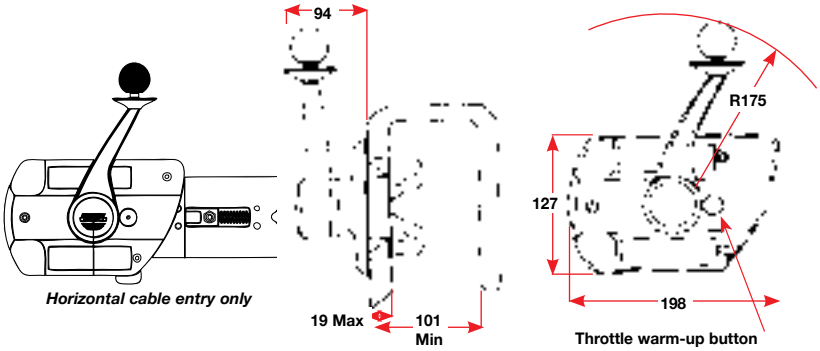
- Non-corrosive rigid polymer exposed housing with die-cast zinc alloy handle
- Gold passivated steel concealed back plate and linkages



BLA Code	Description
306774	MV-3 standard control
306776	MV-3 control with safety switch

Accessories:

306778 Optional neutral safety switch



Side Mount Control - ST

Single Function Control:

Simple single lever, single function chrome finish control, commonly used on throttle.

Features:

- Simple installation
- Simple reliable operation
- Controlled lever friction

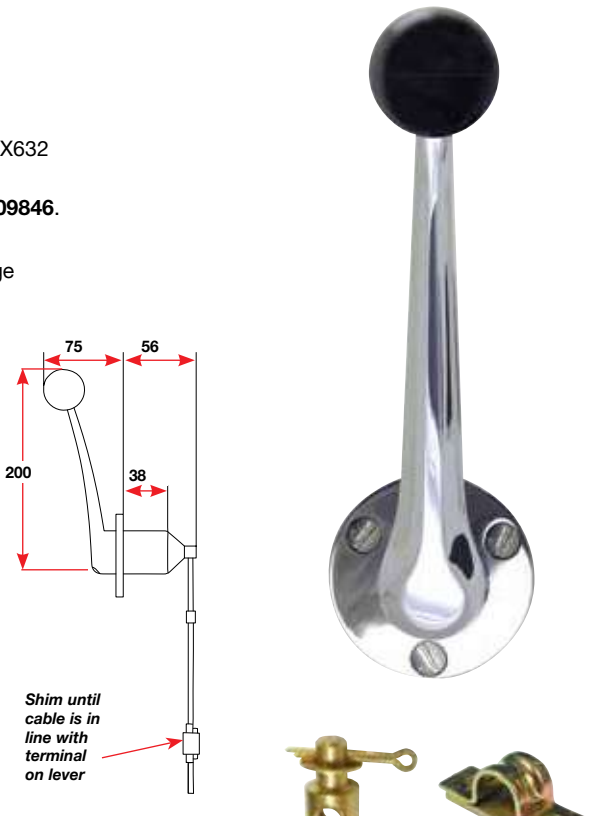
Cables:

Accepts universal 30/33 series cables, CC230, CC330, CC332, CX632 and CCX633.

Also accepts 40/43 series cables with purchase of **309816** and **309846**.

Materials:

- Marine quality chrome over die-cast zinc alloy handle and flange
- Anodised alloy shaft
- Gold passivated steel link arm



BLA Code	Description
306937	ST control

Accessories:

309816 40/43 series clamp and shim assembly
309846 40/43 series pivot

N.B. This control does not have detent positioning

Top Mount Controls - MT-3

Dual Function Controls:

The MT-3 control has become the industry standard incorporating classic binnacle styling with dual function levers and a high quality of finish. Suitable for inboards with hydraulic gearboxes, outboards and stern drives. Not suitable for engines with heavy governor loads (i.e. Gardner diesel).

Features:

- Each lever operates both shift and throttle (two levers for two engines)
- Easy distinctive action with positive detents in forward/neutral/reverse
- Handle pulls out to operate neutral throttle warm up
- Can be mounted left or right hand
- Can only shift at low RPM thereby protecting gearbox
- Optional neutral safety switch to ensure engine only starts when in neutral
- Dual station capability (requires exchangers - refer page 837)
- Chrome housing gives quality look to your saloon, cabin or flybridge
- Three shift stroke adjustment positions
- Built-in friction drag helps prevent slippage and throttle creep while underway

Cables:

Accepts universal 30/33 series cables, CC230, CC330, CC332, CX632 and CCX633.

Single engine controls can be installed with 40/43 series cables for heavy duty applications; fittings for these cables to be ordered separately. Twin engine control cannot use 40/43 series cables because of internal space limitations.

Materials:

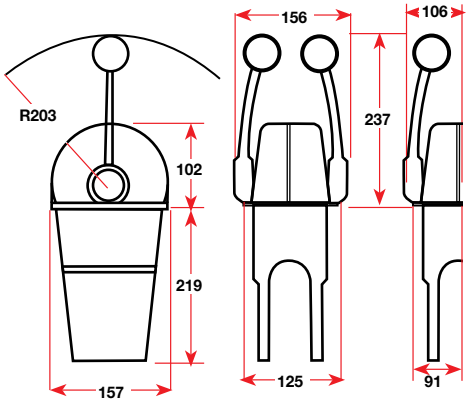
- Marine quality chrome plated die-cast zinc alloy housing
- Zinc alloy mechanism
- Stainless steel link plates

306700

306704

306706

306708

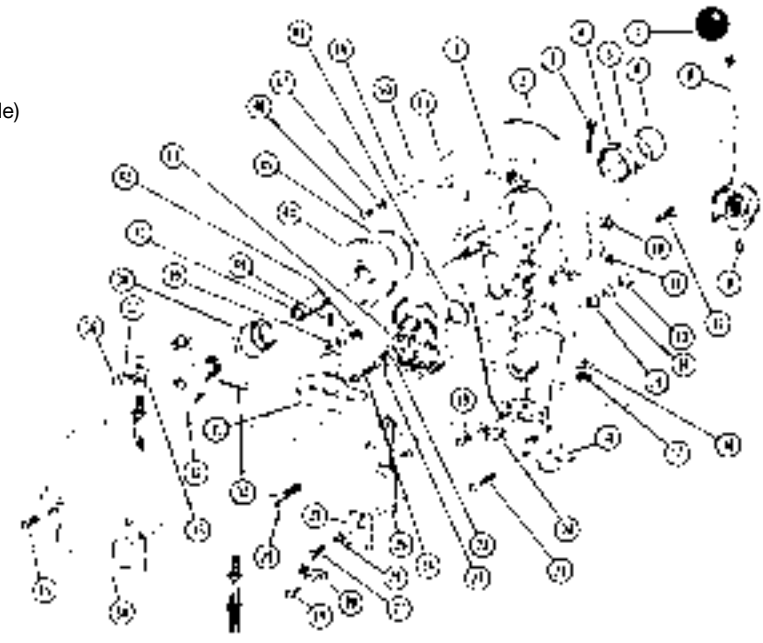


BLA Code	Description
306700	MT-3 single engine control
306704	MT-3 twin engine control

Accessories & Parts:

306706	Conversion kit suit 40/43 series cable (single)
306708	Optional neutral safety switch
309924	Dual station kit t/s 30/33 series

Service Parts:		***Item No.***
309985	Decal “FWD-REV”	2
309927	Drive gear bearing	4
309989	Knob red	7
309987	Knob black	
309931	Handle	8
309984	Collar	15
309782	Cable clamp	20
309926	Shift bearing	22
309983	Shoulder bush	26
309991	Grooved pin	30
309925	Throttle arm	32
309860	Cable terminal	33
309935	Side plate	34
309930	E-ring	36
309933	Cable end pivot	39
309928	Bearing	41
309936	Spacer washer	48
309990	Flat spring MT-3	50
309992	Hardware bag single	2, 3, 16, 17, 19
309993	Hardware bag twin	20, 33, 36, 37, 39, 40, 42



Top Mount Controls - 'S' Series

Single Function Controls:

Top quality controls with chrome finish above dash, stainless steel hanger plates and classic styling, combined to produce controls suited to both exterior and interior installations. Suits inboards with hydraulic gearbox, stern drives and outboards.

Features:

- One handle for gear, one handle for throttle
- Available in single lever or twin lever versions
- Each lever suitable for throttle or gear, with optional detents for forward/neutral/reverse and throttle
- Incorporates brake to prevent throttle creep
- Ideal for dual station installations, both controls move in unison
- Optional neutral safety switch for start in gear protection

Cables:

Accepts universal 30/33 series cables, CC230, CC330, CC332, CX632 and CCX633. Fittings for these cables supplied with control.

Materials:

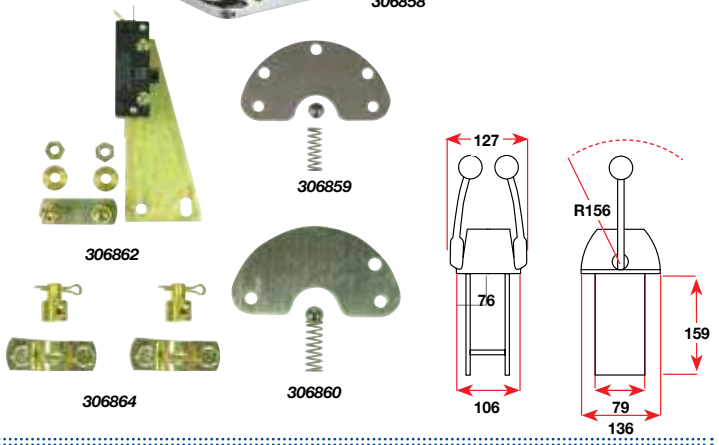
- Marine quality chromed heavy duty zinc alloy housing
- Stainless steel hanger plates
- Zinc alloy internal rocker arm

BLA Code	Description
306857	Single 'S' control (single lever)
306858	Twin 'S' control (twin lever)

Accessories:

306859	Optional gear detent kit (1 per engine)
306860	Optional throttle detent kit (1 per engine)
306862	Optional neutral safety switch (1 per engine)
306863	Hardware bag, per lever (included with control)
306864	30/33 series dual station kit (1 per engine)

N.B. Clutch and throttle detents are not included with controls



Top Mount Control - Twin SR

Single Function Control:

Solid all metal construction with stainless steel cover plate, marine standard chromed levers, and the ability to configure either lever for throttle or gear, make the SR a very versatile option for commercial and recreational craft applications. Suits inboards with hydraulic gearbox, stern drives and outboards.

Features:

- One handle for gear, one handle for throttle
- Each lever suitable for throttle or clutch
- Detents for forward/neutral/reverse available separately to suit installation requirement
- Incorporates adjustable brake for throttle creep
- Ideal for dual station installations, both controls move in unison
- Optional neutral safety switch for start in gear protection

Cables:

Accepts universal 30/33 series cables, CC230, CC330, CC332, CX632 and CCX633. Fittings for these cables supplied with control.

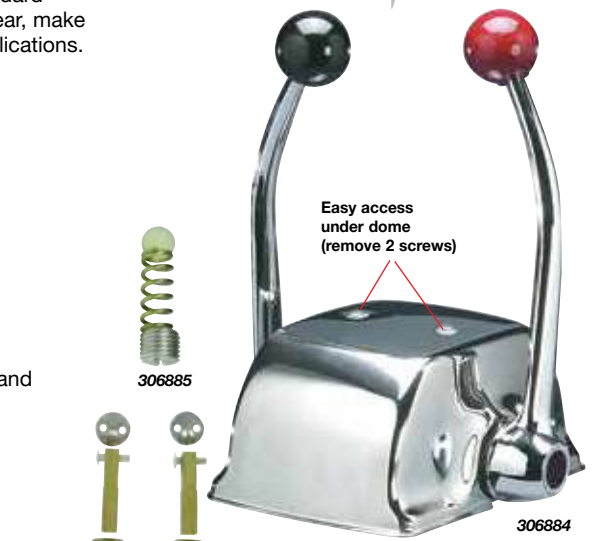
Materials:

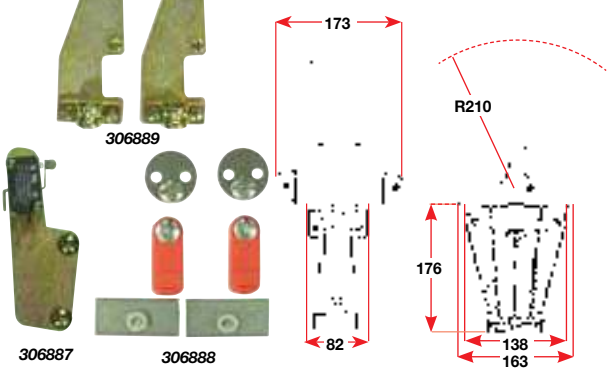
- Stainless steel cover plate, chromed cast zinc alloy handles
- Gold passivated die-cast mechanism, stainless steel
- Plastic and brass cable connection
- Hardware adaptors are gold passivated steel

BLA Code	Description
306884	Twin SR control

Accessories:

306885	Optional gear detent kit (1 per engine)
306887	Optional neutral safety switch (1 per engine)
306888	30/33 series dual station kit (1 per engine)
306889	40/43 series dual station (1 per engine)
298540	Replacement handle for control
298546	30/33 series cable termination eye
298538	Main housing bearing





Flush Top Mount Controls - CH4400

Single Function Controls:

Stylish twin lever, flush top mount controls suitable for inboards with hydraulic gearboxes, stern drives and outboards.

Features:

- Stylish look with either straight or raked handles
- Independent shift and throttle actuation, one lever shift, the other throttle
- Dual station capability. Both stations operate simultaneously
- Removable knobs allow for recessed mounting
- Push or pull cable actuation of shift and throttle
- Adjustable ratchet feel for precise throttle
- Optional neutral safety switch
- Optional handle stop kit

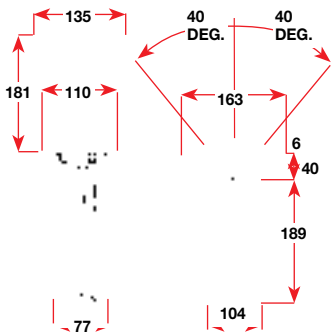
Cables:

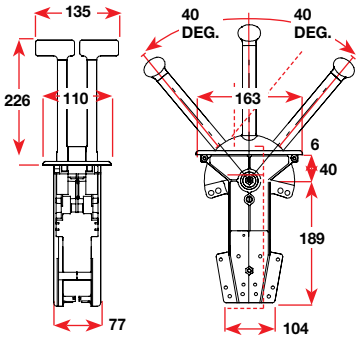
Accepts universal 30/33 series cables,

CC230, CC330, CC332, CX632 and CCX633.

Materials:

- Die-cast zinc alloy with marine grade chrome finish





BLA Code	Description
301202	Straight handle control
301206	Raked handle control

Accessories:

301214	Dual station kit (1 per engine)
301224	Optional handle stop kit

Top Mount Controls - NB Series

Single Function Control:

A durable chrome finish control with stainless steel lever arms, suitable for exposed installations. Controls with throttle lever have a twist grip throttle brake to handle larger diesel mechanism throttle/governor loads. Suits inboards with hydraulic gearbox, stern drives and outboards.

Features:

- One function, one or two levers
- One handle for gear, one handle for throttle
- Available as throttle only, or gear and throttle, or twin throttle
- The throttle brake is simply applied by twisting the lever once the desired setting has been established
- Detents for forward/neutral/reverse incorporated in gear controls
- Can be used for dual station installations, where both stations move together, although care must be taken to avoid operating one station if the other throttle is firmly dampened down
- Especially suitable for engines with heavy governor load (i.e. Gardner diesel)

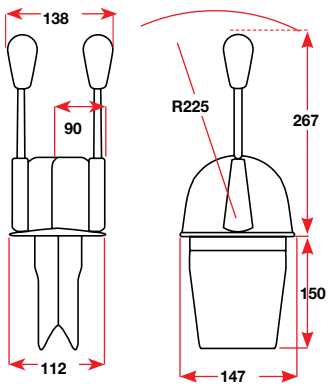
Cables:

Accepts universal 30/33 series cables, CC230, CC330, CC332, CX632 and CCX633. Fittings for these cables are supplied with control.

Also accepts 40/43 series cables. Fittings for these cables are also supplied with control.

Materials:

- Marine quality chrome plated
- Die-cast zinc alloy housing
- Stainless steel lever arms
- Die-cast zinc alloy internal rocker arm



BLA Code	Description
306875	Single lever throttle control
306876	Twin lever throttle & gear control
306877	Twin lever throttle only control

Accessories:

306878	30/33 series dual station kit (1 per pair of levers)

Side Mount Control - Economy

Single Function Control:

Simple surface mount control that will accept a wide variety of cables for outboard applications.

Features:

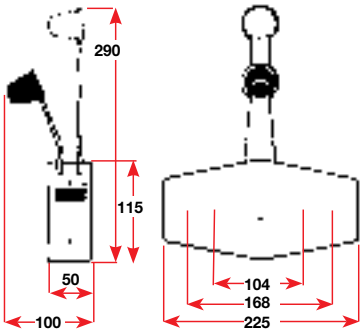
- One lever for gear, one lever for throttle
- Basic mechanism for easy installation
- Can be mounted left or right hand

Cables:

Accepts universal 30/33 series cables, CC230, CC330, CC332, CX632 and CCX633. Fittings also included to accept Evinrude®/Johnson® 479 type cables, Mercury®/Mariner® 600A cables and Mariner® 630 type cables.

Materials:

- U.V. stabilised ABS plastic housing
- Aluminium levers
- Stainless steel fastenings
- Polyamid nylon and zinc plated steel concealed cable mount hardware



BLA Code	Description
306924	Economy side mount control

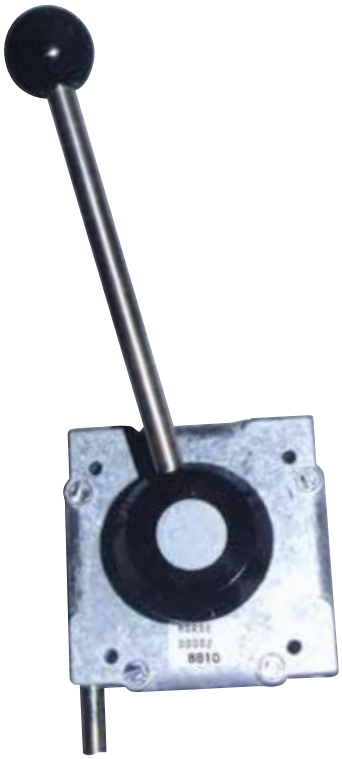
Side Mount Control - 'D' Series

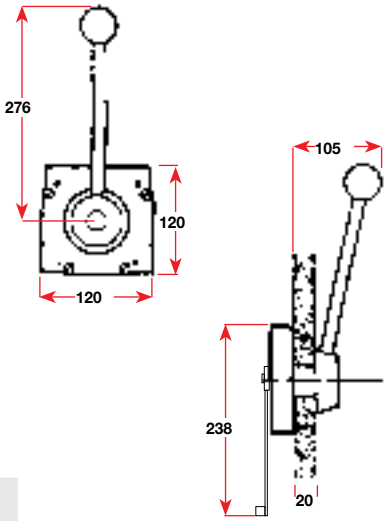
Single Function Control:

These controls are used in heavy duty applications with a maximum load of up to 50kg force. They are also useful where long travel is required, e.g. marine jet bucket control.

Features:

- Can be mounted left-hand or right-hand
- Rotary drive mechanism gives 225mm (9") travel over 230˚ handle movement
- Suits mechanical marine gearboxes
- Suits most marine jet units, e.g. Hamilton reverse bucket





BLA Code	Description
306943	Single lever gear only control

Accessories:

282535 Pillar steel, 60mm refer page 749
282536 Pillar steel, 110mm refer page 749
282552 Clevis end, ⅜" pin refer page 751
282559 Ball joint, ⅜" UNF refer page 751
282561 Ball joint, stainless steel ⅜" UNF refer page 751

Dual Station Exchangers

When using dual function controls in dual station applications, it is necessary to isolate the two systems by the use of dual station exchangers, as it is not possible to back drive dual function controls. The system utilises a dual station unit for each engine function e.g. throttle and gear shift. The gear control's dual station exchanger has a simple latching mechanism, controlled by a selector at the main station, this isolates the station not in use and prevents inadvertent operation. Suitable for inboards with hydraulic gearboxes, inboards with light duty mechanical gearboxes, stern drives and outboards.

Function:

- To be used with dual function, single lever controls to allow operation of both gear and throttle from two separate locations
- Throttle and gear exchangers are mounted close to engines
- Station selector is mounted close to main station

Features:

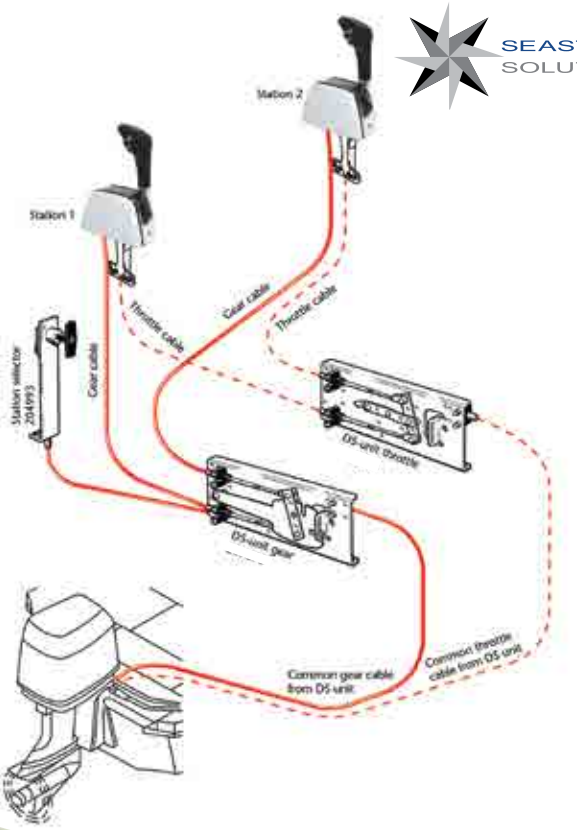
- Unique lock out mechanism allows the skipper to isolate the unattended control

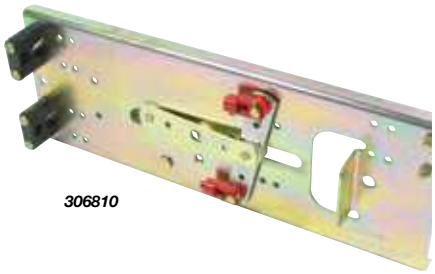
Cables:

CCX632 and CCX633 cables recommended. Also accepts universal 30/33 series cables, CC230, CC330 and CC332.

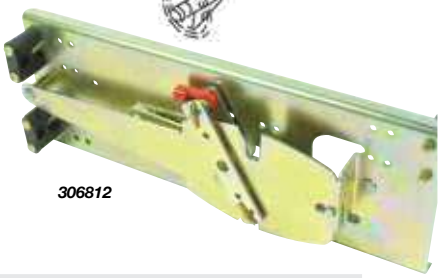
Materials:

Throttle and gear exchangers are manufactured from gold passivated steel.





306810



306812

306818

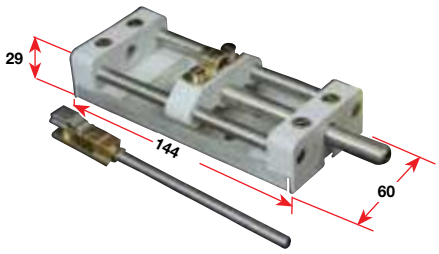
BLA Code	Description	Number of Units Single Engine Installation	Required for Twin Engine Installation
306810	Dual station exchanger throttle unit	1	2
306812	Dual station exchanger gearbox unit	1	2
306818	Station selector unit (passivated steel)	1	1
	Single lever controls	2	4
	Twin lever controls	N/A	2
Cable Application Chart			
Control head to dual station exchanger		4	8
Dual station unit to throttle & gearbox		2	4
Station selector to dual station unit		1	2

Dual Station Selection Kit

Fitted in dual station installations with dual function controls. This unit enables independent gear or throttle shift control from either station. Single engine installations will require two units. Twin engine installations will require four units. Supplied with clevis and cable extensions.

Materials:

- Extruded aluminium
- Stainless steel, brass, nylon and gold passivated steel



BLA Code
301102

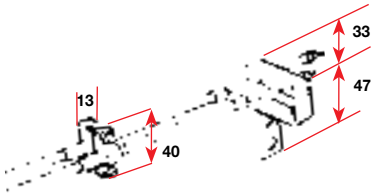
N.B. Station in operation must be returned to neutral position before operating other station.

Dual Station Throttle Selection Kit

This adaptor provides connection of two throttle cables to one engine connection with independent operation - for dual station applications with dual function controls only. Throttle return is via engines return spring or external spring if required. Used in conjunction with **301102** dual station gear units.

Materials:

- Brass, stainless steel and passivated steel



BLA Code
301110

Control Cables

What to consider when selecting cables

SeaStar Solutions® makes engine control cables for a wide variety of applications. They recommend their use with SeaStar Solutions® controls as well as in engine manufacturers' control systems.

Cables are available in three grades

Standard cables are suitable for most applications with short, simple cable routings. Mid-range cables are recommended for somewhat longer cable routings and heavier use than their standard counterparts. For difficult cable routings or anywhere uncompromising performance is needed, use Premium (XTREME™) control cables.

OEM Replacement Type

These throttle/shift control cables are direct replacements for applications using engine makers' controls with proprietary cable interfaces, such as: Evinrude®, Johnson®, Mariner®, MerCruiser®, Mercury®, Force® and some Volvo® engines. Most other engine makers use universal type cables (10-32 UNF threaded ends) and connection kits.

Universal 30/33 Series

Universal 30/33 series throttle/shift control cables are direct replacements for many boats using aftermarket controls or the following engine makers controls: Yamaha®, Honda®, Suzuki®, Tohatsu®, Volvo®, BMW®, Chrysler® and others. These are offered in five versions: one standard, three midrange and one premium (XTREME™).

Universal 40/43 Series

Heavy duty universal type control cables are available in mid-range and XTREME™ versions only.

How to Measure Control Cable Length

For initial installations, measure the distances A and B along an unobstructed path to the throttle and/or gear connection. Add A and B together then round up to the next cable length. That is the recommended length. Cable bends for most cables should not be less than 150mm radius. Cable bends using Premium Cables can be as low as 100mm radius but it should be noted that tight radii increase friction. Care should be taken to avoid unnecessary cable bends because each bend adds to a cable's friction and lost motion.

For outboard applications it is necessary to add an additional 600mm loop at the front of the engine to allow unrestricted steering movement.

For replacement cable installations simply remove the cable from the boat and measure the cable as indicated to the right.

SEASTAR SOLUTIONS

CC189 Mercury Gen II type

CC179 Mercury/Mariner® XTREME™ 600A type

CC205 Johnson® Evinrude® XTREME™ 479 type

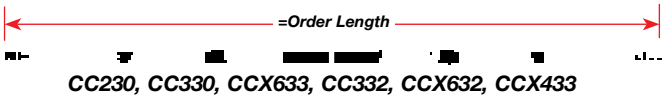
CC210 Mariner® 630 type

CC170 Johnson® Evinrude® 400 type

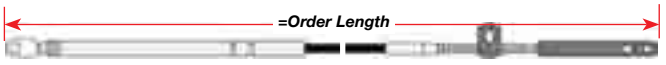
CC332, CCX632, CC172, CC330, CCX633 universal 30/33 series (10-32 UNF threaded ends)

CCX433 (¼" UNF threaded ends)

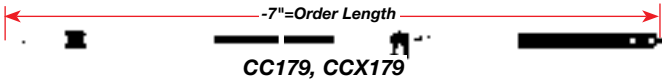
SeaStar Solutions® control cables meet or exceed industry standards/certification requirements and OEM specifications



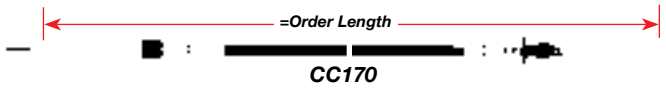
CC230, CC330, CCX633, CC332, CCX632, CCX433



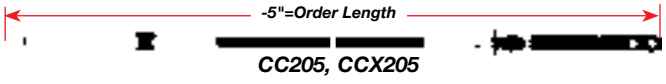
CC189



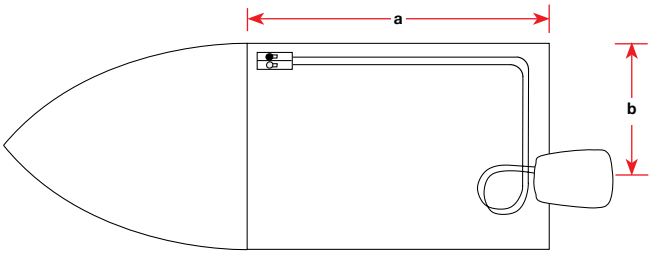
CC179, CCX179



CC170

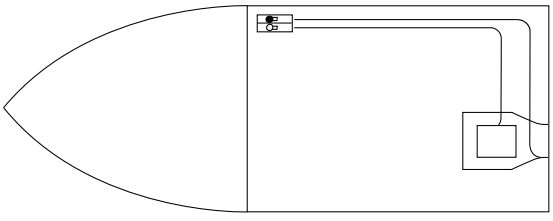


CC205, CCX205



Outboard

Measure cable path, add 600mm for loop & round up to the next cable length (1 foot increments),



Inboard and Sterndrive

Measure cable path and round up to the next cable length (1 foot increments).

CC230 Standard Control Cables - Black

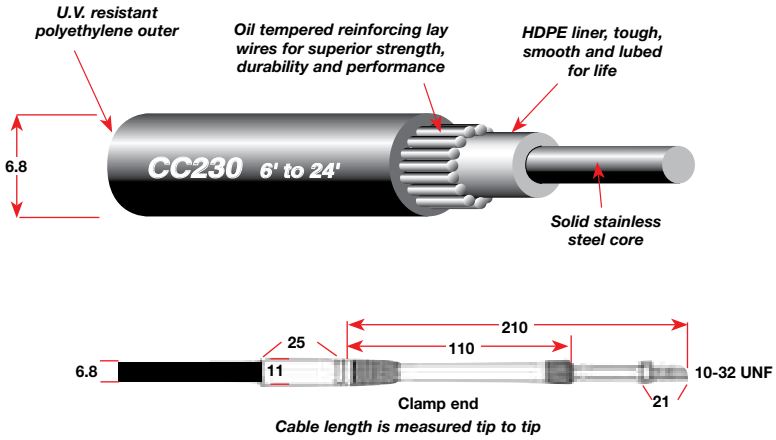
Replaces CC172 Control Cables

Standard duty cables with stainless steel Lubri-core™ wire for smooth operation.

Specifications:

- Fits directly into SeaStar Solutions® controls and all controls that accept universal type cables
- Stainless steel end fittings, 10-32 UNF threads
- Nominal 75mm travel
- Stainless steel Lubri-core™ solid core wire
- 16 lay wire reinforced outer jacket, 6.8mm outside diameter
- 150mm minimum bend radius
- Suits stern drives, inboards and outboards

BLA Code	Cable m	Length ft
303006	1.83	6
303007	2.13	7
303008	2.44	8
303009	2.74	9
303010	3.05	10
303011	3.35	11
303012	3.66	12
303013	3.96	13
303014	4.27	14
303015	4.57	15
303016	4.88	16
303017	5.18	17
303018	5.49	18
303019	5.76	19
303020	6.10	20
303021	6.40	21
303022	6.71	22
303023	7.01	23
303024	7.32	24



New Cable Construction

New Construction CC230XX

- 16 Lay wires
- Stainless Steel conduit fittings

Old Construction CC172XX

- 6 Lay wires
- Brass conduit fittings

CC330 Mid Range Control Cables - Black

Replaces CC330 Miracable Control Cables

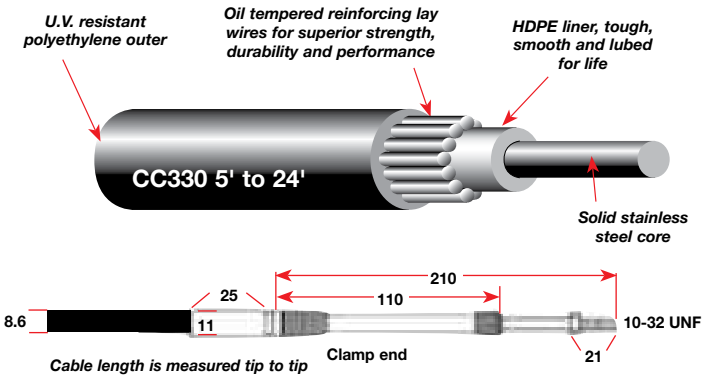
Mid range cables with heavier jacket and stainless steel Lubri-core™.

Specifications:

- Fits directly into SeaStar Solutions® controls and all controls that accept universal type cables
- Stainless steel end fittings, 10-32 UNF threads
- Nominal 75mm travel
- Stainless steel Lubri-core™ solid core wire
- 150mm minimum bend radius
- 20 lay wire strand reinforced outer jacket. 8.6mm outside diameter
- Suits stern drives, inboards and outboards

BLA Code	Cable m	Length ft
303105	1.52	5
303106	1.83	6
303107	2.13	7
303108	2.44	8
303109	2.74	9
303110	3.05	10
303111	3.35	11
303112	3.66	12
303113	3.96	13
303114	4.27	14

BLA Code	Cable m	Length ft
303115	4.57	15
303116	4.88	16
303117	5.18	17
303118	5.49	18
303119	5.79	19
303120	6.10	20
303121	6.40	21
303122	6.71	22
303123	7.01	23
303124	7.32	24

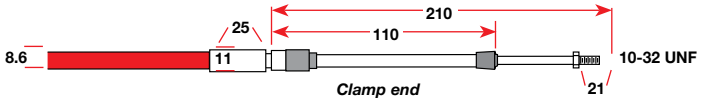


CCX632 XTREME™ Premium Control Cables - Red

Replaces 33C Supreme Control Cables

Specifications:

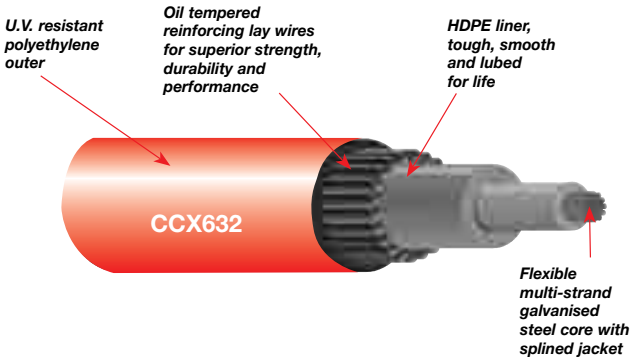
- Fits directly into SeaStar Solutions® controls and all controls that accept universal type cables
- Stainless steel rod end and hub, anti-corrosive end sleeve
- Nominal 75mm travel
- Suits stern drives, inboards and outboards
- Ideal for multi-station and longer run installations
- Flexible multi-strand galvanised steel core with splined jacket
- 100mm minimum bend radius
- Wire strand reinforced outer jacket, 8.6mm outside diameter



Cable length is measured tip to tip

BLA Code	Cable m	Length ft
303205	1.52	5
303206	1.82	6
303207	2.13	7
303208	2.44	8
303209	2.74	9
303210	3.05	10
303211	3.35	11
303212	3.66	12
303213	3.96	13
303214	4.27	14
303215	4.57	15
303216	4.88	16
303217	5.18	17
303218	5.49	18
303219	5.79	19
303220	6.10	20
303221	6.40	21
303222	6.71	22
303223	7.01	23
303224	7.32	24
303225	7.62	25
303226	7.92	26
303227	8.23	27
303228	8.53	28
303229	8.84	29
303230	9.14	30

BLA Code	Cable m	Length ft
303232	9.75	32
303234	10.36	34
303236	10.97	36
303238	11.58	38
303240	12.19	40
303242	12.80	42
303244	13.41	44
303246	14.02	46
303248	14.63	48
303250	15.24	50
303252	15.85	52
303254	16.46	54
303256	17.07	56
303258	17.68	58
303260	18.29	60
303262	18.91	62
303264	19.51	64
303266	20.12	66
303268	20.72	68
303270	21.34	70
303272	21.95	72



N.B. Longer lengths available on request

How to Choose the Right 33 Series Cable

SeaStar Solutions® offers five models of universal 33 series type cables, each suited to certain operating conditions and installation parameters. Below are key variables that affect how cables perform:

Backlash: the lost motion between the amount of movement put in (input end of the cable) and the amount of movement which occurs at the output end of the cable. Some motion is generally lost in 'take up' between the inner wire (core) of the cable and the outer casing (conduit). Backlash manifests itself as free play (slop) felt at the control handle.

Efficiency: the percentage of input force that is transmitted through the cable as output force. For example, if a 10-pound force was exerted on the cable at its input end and resulted in the cable exerting an 8-pound output force, the cable would be 80% efficient.

Breakaway: the 'feel' of the cable when put into motion; the breakaway threshold is the force that must be applied to the cables input end before something happens at the output end. An example of excessive breakaway; a control that would have to be moved to half-throttle before the engine responded.

Cable Routing: the shorter and straighter the cable routing, the better the cable will perform. With increased length and bends, cable efficiency is reduced, while breakaway and backlash rise.

Environment: generally, the more rugged the cable construction, the longer the cable will last. In harsh environments such as heavy salt and U.V. exposure, control cables with thicker conduits and stainless steel fittings will generally outlast those with thinner conduits and brass or steel fittings.

Cable design, manufacturing tolerances, length and installation care are additional factors to consider.

33 Series Cable Type	Backlash	Break Away/Efficiency	Long/Complex Routings	Harsh Environment
CC230	Good	Good	Good	Good
CC330	Better	Better	Better	Superior
CC332	Better	Better	Better	Superior
CCX633/632	Superior	Superior	Superior	Superior

CCX633 XTREME™ Premium Control Cables - Black

Traditional cables vary by the stiffness of the core wire and how tightly it fits in the casing. Thus the classic trade-offs that have existed in control cable design are:

- **Stiffer core/tighter fit** — offers less lost motion, but is harder to move. With longer and more complex runs, cable movement becomes progressively more difficult.
- **More flexible core/looser fit** — has an easier feel, but has more lost motion. This approach leads to an overall sloppy feel, RPM variation or difficult gear engagement.

These trade-offs aren't an issue with XTREME™ cables because they are different - really different

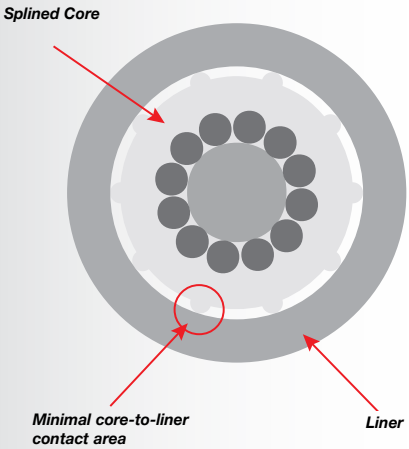
XTREME's unique design incorporates a patent-pending splined core. Ridges on the core allow a close fit with the cable's inner liner, but with minimum contact, so the core glides back and forth smoothly like a skater on ice.

RESULT: a control cable with easy movement AND minimum lost motion.

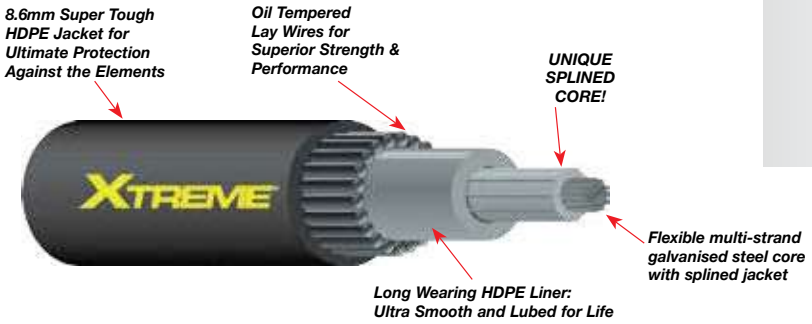
Specification:

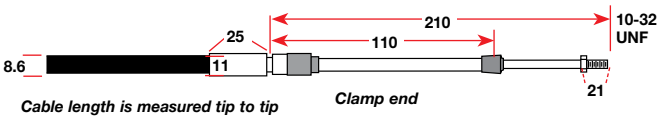
- Particularly suited to complex routing and longer runs
- Fits directly into SeaStar Solutions® controls and all controls that accept universal type cables
- Stainless steel and chrome brass end fittings. 10-32 UNF threads
- Nominal 75mm travel
- Flexible multi-strand galvanised steel core with splined jacket
- 100mm minimum bend radius
- Parallel lay wire strand reinforced outer jacket for superior strength and flexibility
- Suits stern drives, inboards and outboards

Premium Control Cables Cross Section of Core and Liner:



The Core Difference:





Cable length is measured tip to tip

BLA Code	Cable m	Length ft	BLA Code	Cable m	Length ft
303310	3.05	10	**303332**	9.75	32
303311	3.35	11	**303334**	10.36	34
303312	3.66	12	**303336**	10.97	36
303313	3.96	13	**303338**	11.58	38
303314	4.27	14	**303340**	12.19	40
303315	4.57	15	**303342**	12.80	42
303316	4.88	16	**303344**	13.41	44
303317	5.18	17	**303346**	14.02	46
303318	5.49	18	**303348**	14.63	48
303319	5.79	19	**303350**	15.24	50
303320	6.10	20	**303352**	15.85	52
303321	6.40	21	**303354**	16.46	54
303322	6.71	22	**303356**	17.07	56
303323	7.01	23	**303358**	17.68	58
303324	7.32	24	**303360**	18.29	60
303325	7.62	25	**303362**	18.91	62
303326	7.92	26	**303364**	19.51	64
303327	8.23	27	**303366**	20.12	66
303328	8.53	28	**303368**	20.72	68
303329	8.84	29	**303370**	21.34	70
303330	9.14	30	**303372**	21.95	72

CCX433 XTREME™ Premium Heavy Duty Control Cables - Black

Traditional cables vary by the stiffness of the core wire and how tightly it fits in the casing. Thus the classic trade-offs that have existed in control cable design are:

- **Stiffer core/tighter fit** — offers less lost motion, but is harder to move. With longer and more complex runs, cable movement becomes progressively more difficult.
- **More flexible core/looser fit** — has an easier feel, but allows more lost motion. This approach leads to an overall sloppy feel, RPM variation or difficult gear engagement.

These trade-offs aren't an issue with XTREME™ cables because they are different - really different

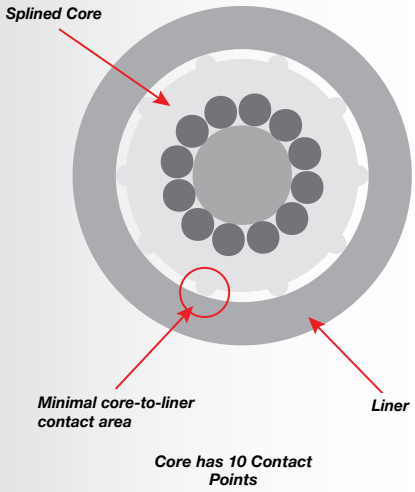
XTREME's unique design incorporates a patent-pending splined core. Ridges on the core allow a close fit with the cable's inner liner, but with minimum contact, so the core glides back and forth smoothly like a skater on ice.

RESULT: a control cable with easy movement AND minimum lost motion.

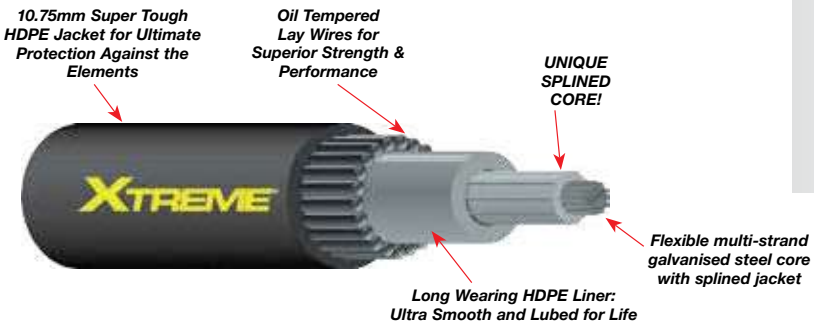
Specifications:

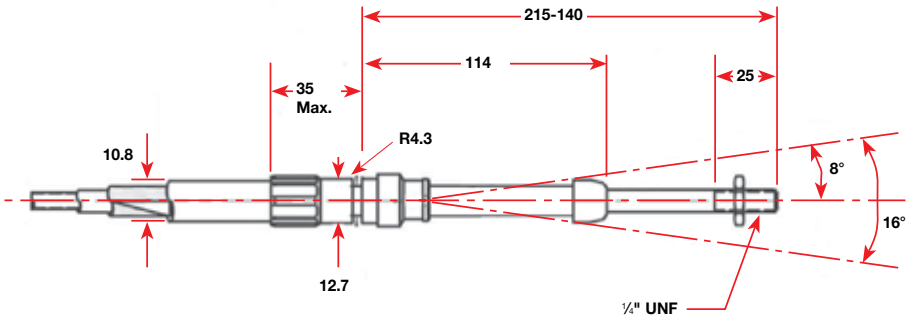
- Particularly suited to heavy use, higher loads, complex routing and longer runs
- Stainless steel rod ends and hub
- 75mm nominal travel
- Flexible multi-strand galvanised steel core with splined jacket
- 200mm minimum bend radius
- 28 lay wire strand reinforced outer jacket for superior strength and flexibility, 10.75mm outside diameter.

Premium Control Cables Cross Section of Core and Liner:



The Core Difference:





BLA Code	Cable m	Length ft
308710	3.04	10
308711	3.35	11
308712	3.65	12
308713	3.96	13
308714	4.26	14
308715	4.57	15
308716	4.87	16
308717	5.18	17
308718	5.48	18
308719	5.79	19
308720	6.09	20
308721	6.40	21
308722	6.70	22
308723	7.01	23
308724	7.31	24
308725	7.62	25
308726	7.92	26
308727	8.22	27
308728	8.53	28
308729	8.83	29
308730	9.14	30

N.B. Longer lengths available on request

Clamp end

CC170 Evinrude®/Johnson® 400 Type Control Cables - Pre 1979

BLA Code	Cable m	Length ft
303508	2.44	8
303509	2.74	9
303510	3.05	10
303511	3.35	11
303512	3.66	12
303513	3.96	13
303514	4.27	14
303515	4.57	15

Specifications:

- Stainless steel core wire with Lubri-core™
- 150mm minimum bend radius
- Outside diameter of cable is 6.8mm
- Brass and moulded plastic end fittings
- Exceeds engine manufacturers specifications
- Black U.V. resistant polyethylene outer
- Drop in replacement cable utilising existing connection components

CC205 Evinrude®/Johnson® 479 Type Control Cables - 1979 and later

BLA Code	Cable m	Length ft
303606	1.83	6
303607	2.13	7
303608	2.44	8
303609	2.74	9
303610	3.05	10
303611	3.35	11
303612	3.66	12

BLA Code	Cable m	Length ft
303613	3.96	13
303614	4.27	14
303615	4.57	15
303616	4.88	16
303617	5.18	17
303618	5.49	18
303620	6.10	20
303621	6.40	21
303622	6.70	22

Specifications:

- Complete drop-in replacement cable for Evinrude®/Johnson® outboards and inboards (1979 - to date) with Evinrude®/Johnson® control
- Stainless steel core wire with Lubri-core™
- Outside diameter of cable is 6.8mm
- Stainless steel, brass and moulded plastic fittings
- 150mm minimum bend radius
- Exceeds engine manufacturers specifications
- Black U.V. resistant polyethylene outer

CCX205 Evinrude®/Johnson® 479 Type XTREME™ Control Cables - 1979 and later

BLA Code	Cable m	Length ft
304009	2.74	09
304010	3.05	10
304011	3.35	11
304012	3.66	12
304013	3.96	13
304014	4.27	14
304015	4.57	15
304016	4.88	16
304017	5.18	17
304018	5.49	18

BLA Code	Cable m	Length ft
304019	5.79	19
304020	6.10	20
304022	6.40	22
304024	7.32	24
304026	7.92	26
304028	8.53	28
304030	9.14	30
304032	9.75	32
304034	10.36	34
304036	10.97	36

BLA Code	Cable m	Length ft
304038	11.58	38
304040	12.19	40
304042	12.80	42
304044	13.41	44
304046	14.02	46
304048	14.63	48
304050	15.24	50

Specifications:

- Complete drop-in replacement cable for BRP®/Evinrude®/Johnson® outboards and inboards (1979 - date) with BRP®/Evinrude®/Johnson® control
- Heavy duty 8.6mm outside outer case
- Stainless steel, brass and moulded plastic fittings
- Exceeds engine manufacturers specifications
- Black U.V. resistant polyethylene outer

CC210 Mariner® 630 Type Control Cables 1992 and earlier Mariner® 40HP and below

BLA Code	Cable m	Length ft
303907	2.13	7
303908	2.44	8
303909	2.74	9
303910	3.05	10
303911	3.35	11
303912	3.66	12

BLA Code	Cable m	Length ft
303913	3.96	13
303914	4.27	14
303915	4.57	15
303916	4.88	16
303917	5.18	17
303918	5.49	18

Specifications:

- Replacement cable for Mariner® low horsepower engines (pre 1993) when used with Mercury® controls
- Stainless steel, brass and moulded plastic fittings
- 150mm minimum bend radius
- Stainless steel core wire with Lubri-core™
- Black U.V. resistant polyethylene outer
- Exceeds engine manufacturers specifications
- Outside diameter of cable is 6.8mm

CC179 Mercury®/Mariner® 600A Type Control Cables

BLA Code	Cable m	Length ft
303806	1.83	6
303807	2.13	7
303808	2.44	8
303809	2.74	9
303810	3.05	10
303811	3.35	11
303812	3.66	12

BLA Code	Cable m	Length ft
303813	3.96	13
303814	4.27	14
303815	4.57	15
303816	4.88	16
303817	5.18	17
303818	5.49	18
303820	6.10	20

Specifications:

- Fits directly to Mercury®/Mercruiser® motors 1965 to date and Force® motors 1993 to date, fitted with Mercury® controls
- Stainless steel, brass and moulded plastic fittings
- Stainless steel wire core with Lubri-core™
- 150mm minimum bend radius
- Black U.V. resistant polyethylene outer
- Exceeds engine manufacturers specifications
- Outside diameter of cable is 6.8mm
- Use CCX179 for cables over 20 feet

CCX179 Mercury®/Mariner® 600A Type XTREME™ Control Cables

BLA Code	Cable m	Length ft
304110	3.04	10
304111	3.35	11
304112	3.65	12
304113	3.96	13
304114	4.26	14
304115	4.57	15
304116	4.87	16
304117	5.18	17

BLA Code	Cable m	Length ft
304118	5.48	18
304119	5.79	19
304120	6.09	20
304122	6.70	22
304124	7.31	24
304126	7.92	26
304128	8.53	28
304130	9.14	30

BLA Code	Cable m	Length ft
304132	9.75	32
304134	10.36	34
304136	10.97	36
304138	11.58	38
304140	12.19	40
304142	12.80	42
304144	13.41	44
304146	14.02	46

Specifications:

- Fits directly to Mercury®/Mercruiser® motors 1965 to date and Force® motors 1993 to date, fitted with Mercury® controls
- Stainless steel, brass and moulded plastic fittings
- Heavy duty 8.6mm outside outer case
- Exceeds engine manufacturers specifications
- Black U.V. resistant polyethylene outer

BLA Code	Cable m	Length ft
304148	14.63	48
304150	15.24	50

A Complete Family Of Cables:

xtreme technology cables are the ONLY high performance cable family with a FULL RANGE of universal cables and ALL popular direct replacement OEM type cables.

CC189 Mercury®/Mercruiser® Gen II Cables

BLA Code	Cable m	Length ft
303706	1.83	6
303707	2.13	7
303708	2.44	8
303709	2.74	9
303710	3.05	10
303711	3.35	11
303712	3.66	12
303713	3.96	13

BLA Code	Cable m	Length ft
303714	4.27	14
303715	4.57	15
303716	4.88	16
303717	5.18	17
303718	5.49	18
303719	5.79	19
303720	6.10	20

Specifications:

- Fits directly to Mariner®/Mercury®/Mercruiser®/Force® engines fitted with 2003 to date Mercury® 4000 series controls
- Stainless steel, brass and moulded plastic end fittings
- Stainless steel Lubri-core™ solid wire core
- 80mm travel
- 150mm minimum bend radius
- Black U.V. resistant polyethylene outer
- Exceeds engine manufacturers specifications
- Outside diameter of cable is 6.8mm

Maintenance

SeaStar Solutions® suggest the following periodic maintenance is performed at least twice a season:

- Check overall operation for proper gear engagement, full and idle throttle and overall feel
- Visually inspect control head, cable as well as engine and transmission cable attachment points for proper tightness of fasteners, correct operation of all moving parts, worn or broken items, cable chafing or misalignment, and similar
- Do not lubricate core wire (moving wire inside the casing); if the cable operates stiffly, replace it
- Keep cable ends dirt and corrosion free
- Lubricate pivot points and sliding parts of the cable with a good quality water resistant grease

When to replace a cable or connection hardware:

- When excessive free play is felt at the control, even after all cable connections have been verified as in good working order
- When visual inspection shows chafing, breakage or bent, loose or worn parts

Never attempt to repair a cable. Always replace a malfunctioning cable. A cable cannot be properly repaired in the field and must always be replaced as an assembly. Attempting to repair a cable could result in control system failure, leading to personal injury and/or property damage

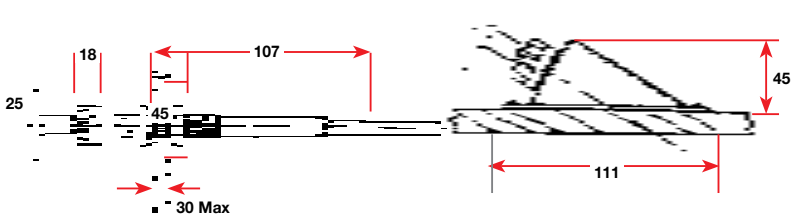
DC Controls

Features:

- One function, “T” handle operation
- Mounts on dashboard or side of wheel box
- Optional angled bracket available
- Turns 30/33 series cables into multi-purpose utility cable
- Ideal for choke, air or fuel shut down

Cable:

- Accepts universal 30/33 series cables, CC230, CC330, CC332, CX632 and CCX633



BLA Code	Reference No.	Description
306990	301916	DC control
306992	048210	Angled bracket

Connection Kit - Mercruiser®

Connects CC230, CC330, CC332, CX632 and CCX633 throttle and shift cables to Mercruiser® stern drives. Injection moulded black nylon with non corrosive retainers.

BLA Code
305018

Connection Kit - Mercury®

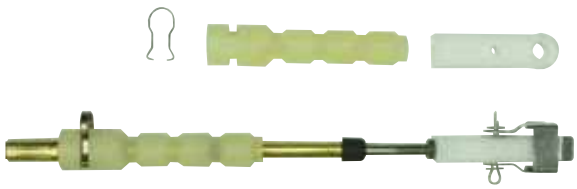
Connects CC230, CC330, CC332, CX632 and CCX633 throttle and shift cables to Mercury® outboards. Injection moulded black nylon with non corrosive retainers.

BLA Code
305022

Connection Kit

- Evinrude®/Johnson®

Connects CC230, CC330, CC332, CX632 and CCX633 throttle and shift cables to pre 1979 Evinrude®/Johnson® outboards. White injection moulded nylon with non corrosive retainers.



BLA Code
305026

Connection Kit

- Evinrude®/Johnson®

Connects CC230, CC330, CC332, CX632 and CCX633 cables to Evinrude®/Johnson® outboards, 1979 and later. White injection moulded nylon with non corrosive retainers.

BLA Code
305030

Control Adaptor Kit - Mariner®

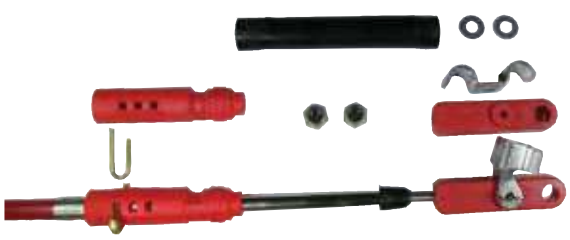
Adapts CC230, CC330, CC332, CX632 and CCX633 throttle and shift cables to suit Mercury®/Mariner® control box used with Mariner® 1992 and earlier, 40HP and below, outboards. Two brass sleeves and 2 eye ends per kit.

BLA Code
284572

Engine Connection Kit

- Evinrude®/Johnson®

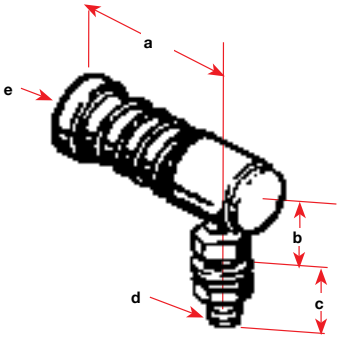
Connects CC230, CC330, CC332, CX632 and CCX633 throttle and shift cables to Johnson® and Evinrude® outboards, 55HP to 235HP, 1973 to date. Two plastic sleeves and two plastic end fittings per kit. Black plastic sleeve also included for gear shift on 1978 & 79, 85 to140HP models.



BLA Code
284580

Ball Joints

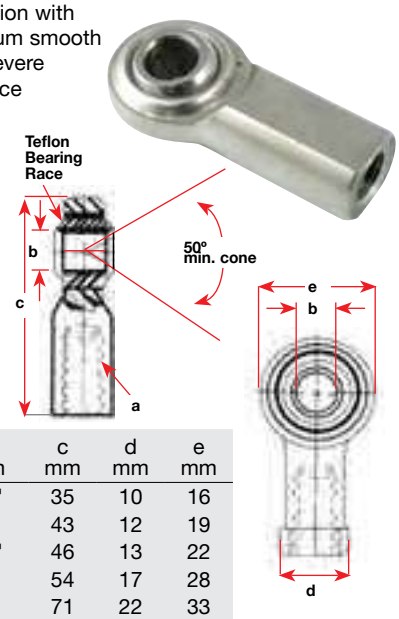
Connect 33, 43 and 63 series control cables to throttle, gear or actuator linkage. Available in stainless steel or gold passivated steel. A spring loaded ball receptor provides quick release.



BLA Code	Material	Cable Series	a mm	b mm	c mm	d Thread	e UNF
305006	Steel	30	23	12	14	¼" UNF	10-32
309702	Steel	30	23	12	11	10-32 UNF	10-32
309706	S/S	30	32	12	14	M6	10-32
309714	Steel	30	32	15	22	5/16" UNF	10-32
309718	Steel	40	25	12	14	¼" UNF	¼"
309720	S/S	40	25	12	16	M6	¼"
309724	Steel	40	25	12	14	5/16" UNF	¼"
309728	Steel	60	32	15	22	5/16" UNF	5/16"
309730	S/S	60	25	13	22	M8	5/16"

Stainless Steel Spherical Rod Ends

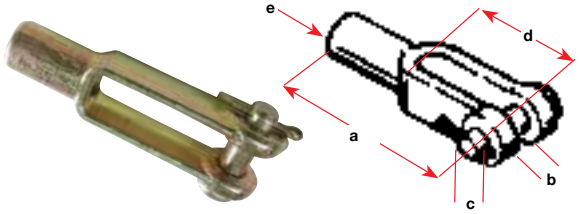
Stainless steel construction with Teflon bearing for optimum smooth operation, even under severe marine conditions. Surface hardened stainless steel ball for high wear resistance. Applications include universal control cable connection, linkage rods and tie rods.



BLA Code	a UNF	b mm	c mm	d mm	e mm
309736	10-32	3/16"	35	10	16
309738	¼"	¼"	43	12	19
309740	5/16"	5/16"	46	13	22
309742	3/8"	3/8"	54	17	28
309744	½"	½"	71	22	33
309746	5/8"	5/8"	83	25	38
309748	¾"	¾"	95	29	45

Clevis Ends

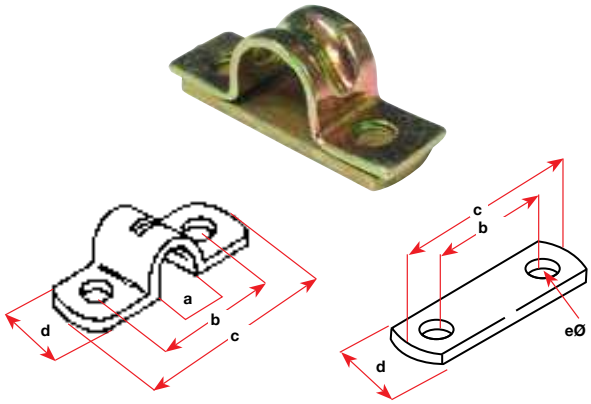
Connect 33, 43 and 63 series control cables to throttle, gear or actuator linkage. Gold passivated steel construction.



BLA Code	Cable Series	a mm	b mm	c mm	d mm	e mm
305002	33	51	7.1	¼"	32	10-32
309752	33	40	4.8	3/16"	25	10-32
309754	33	57	8.7	5/16"	37	10-32
309756	43	51	7.1	¼"	32	¼"
309758	43	57	8.7	5/16"	37	¼"
309760	43	64	11.1	3/8"	41	¼"
309762	63	57	8.7	3/8"	37	5/16"

Cable Clamps and Shims

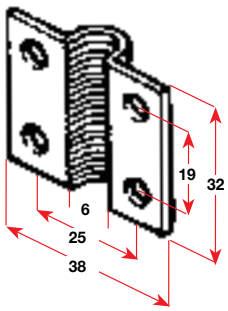
Used to fasten the outer casing of 33, 43 and 63 series control cables with clamp type hubs. Available as separate components or as clamp and shim assemblies. Passivated steel construction, **309782** only is manufactured of stainless steel.



BLA Code	Material	Cable Series	a mm	b mm	c mm	d mm	e mm
Clamps:							
309780	Steel	33	9.5	25	38	13	5
309782	S/S	33	9.5	22	33	13	5
309784	Steel	43	12.7	25	38	13	5
309786	Steel	63	14.3	32	45	19	7
Shims:							
309800	Steel	33 & 43		25	38	13	5
309804	Steel	63		32	45	19	7
Clamps & Shims							
309814	Steel	33	9.5	25	35	13	5
309816	Steel	43	12.7	25	35	13	5
309818	Steel	63	14.3	32	45	19	7

Conduit Clamps

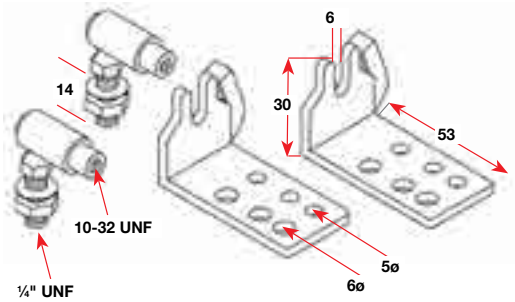
Conduit clamp for actuation end of 33LU utility cables, **307101-37.** Gold passivated steel construction.



BLA Code
309820

Universal Connection Kit

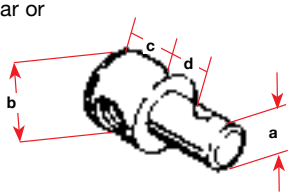
Universal inboard connection kit, contains two **305006** ball joints and two outer cable mount plates. Suits all 30/33 series clamp hub cables.



BLA Code
305014

Pivots

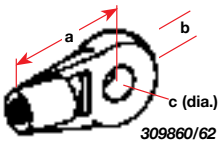
Connects the threaded rod end of 30/33 or 40/43 series cables to throttle, gear or actuator linkage. Machined brass construction.

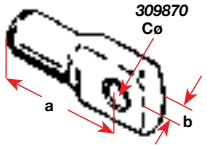


BLA Code	Cable Series	Thread UNF	a in	b mm	c mm	d mm
309840	33	10-32	¼"	11	8	3
309842	33	10-32	¼"	11	10	5
309844	33	10-32	¼"	11	8	8
309846	43	¼"	¼"	11	13	5
309850	43	¼"	5⁄16"	13	14	3

Terminal Eyes

Connects the threaded rod ends of 30/33 or 40/43 series cables to throttle, gear or actuator linkage. Available in moulded nylon, alloy or HRS construction.





BLA Code	Material	Cable Series	Thread UNF	a mm	b mm	c mm
309860	Nylon	30/33	10-32	25	6	5⁄16"
309862	Alloy	30/33	10-32	25	6	5⁄16"
309870	HRS	40/43	10-32	35	8	5⁄16"

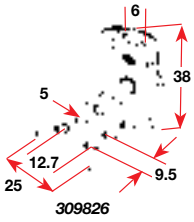
T-Handle

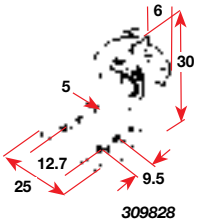
Replacement "T" handle to suit 33 series utility and positive lock cables models.

BLA Code	Description
309952	T-Handle - 33 series utility

Cable Hook Clips - 30/33 Series

Single or twin hook clips offer a secure attachment point for all 30/33 series clamp hub cables. Manufactured from stainless steel.

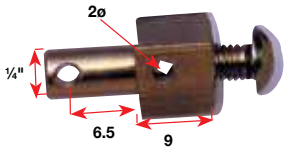




BLA Code	Cables
309826	Single
309828	Double

Pivot

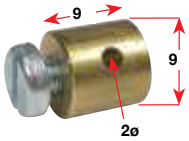
Connects the bare core wire of 33L series utility cables to pull only linkage, such as throttle or engine stop. Brass construction.



BLA Code
309916

Stop Collar

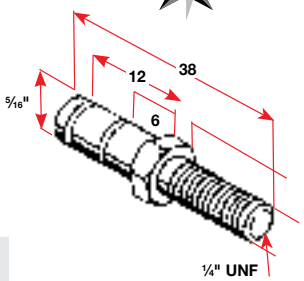
Suits 33L series utility cables where a bare inner cable exists at one end. Simply slide the centre cable through the pre-drilled hole and tighten the screw at the required position. Brass construction.



BLA Code
309908

Stop Collar

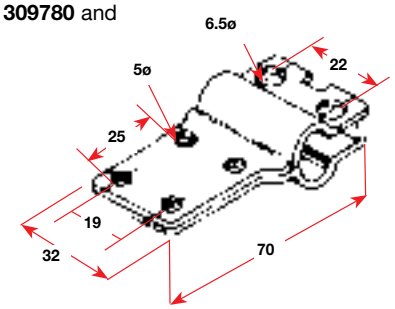
Suits 33L series utility cables where a bare inner cable exists at one end. Simply slide the centre cable through the pre-drilled hole and tighten the screw at the required position. Brass construction.



BLA Code	Cables
309882	Terminal eye pin kit

Clamp Bracket

Two half plates clamp around an existing ½" (12.7mm) diameter rod and provide a mount base to accept **309820**, **309780** and **309784** clamps.



BLA Code
309904

Hydraulic Engine Controls

Hynautic engine control systems set the industry standard for hydraulic engine controls with systems available to suit single engine - single station, all the way through to twin engine triple stations. Machined alloy controls, optioned with ball or 'T' handles offer traditional marine styling with proven reliability. Suited to the recreational cruiser or the full time charter operator.

How The System Works

Hynautic hydraulic engine controls offer the boat owner a very positive, synchronised method of relaying remote commands from multiple stations to the engine's throttle and transmission linkages.

Engine controls have been packaged into systems for complete and simple installation. Systems have been designed for up to three stations, using either nylon tubing or copper tubing. A fourth station is possible, depending upon the length of the tubing run. Nylon tubing is preferred because of ease of installation and the material's expansion characteristics.

The slave unit is designed to deliver up to 139 kgf cm (120 lbf in) of torque through 80 degrees of travel. Therefore a system will accommodate marine engines and hydraulic transmissions used on boats to approx. 30 metres.

When the control handle of the sending unit is moved, mechanical energy is transformed into fluid energy by means of a rack and pinion attached to an internal piston. This piston expels fluid from the sending unit into all other control heads and the slave unit. The pistons in each of these units are thus moved an equal distance, causing a corresponding movement in the lever arm of each. Controls can be synchronised simply by moving the lever arm of any control head from stop to stop.

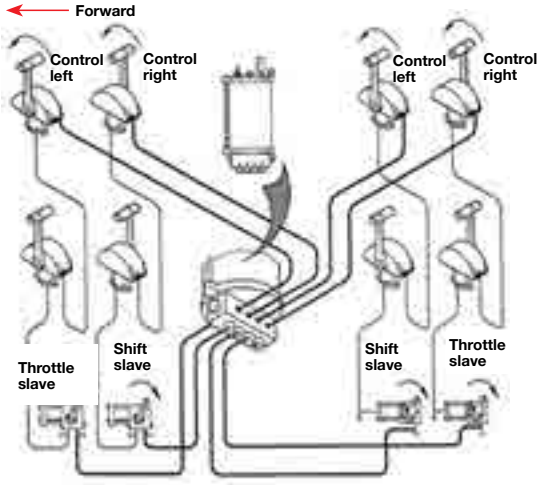
The reservalve maintains the extra fluid and a constant pressure head of 5.5 bar for the system. The flow of fluid within the reservalve is regulated in the charging valve at the base of the reservalve. As fluid expands due to engine temperatures, the excess liquid is expelled into the reservoir at a controlled rate. Likewise, fluid is returned to the system as temperatures drop.

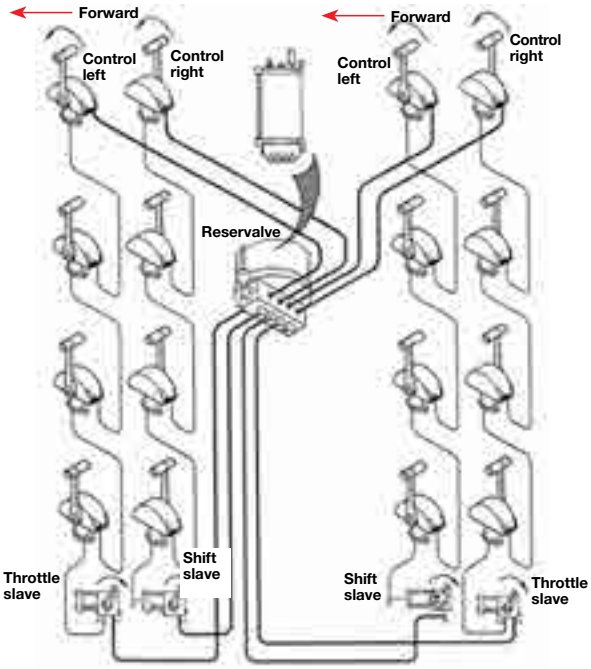
Each throttle slave unit contains an over-travel bungee in its linkage to the engine. This device assures that the slave piston will reach end stroke in each direction to maintain the balance between senders and slave.

The transmission slave unit has a mechanical detent to indicate a neutral position. Each throttle slave is equipped with an internal pilot check valve which prevents control arms from drifting back to an idle position.

System Plumbing

Hynautic engine control systems are easily plumbed utilising 5/16" unplasticised nylon tubing. This tubing expands at a similar rate to the fluid, thus compensating for inevitable fluid expansion and contraction. The tubing is easy to install and special O-ring fittings are supplied with each system. Bleeding the system of air is accomplished via patented bleeder fittings. Systems for copper tubing are also available.





Hydraulic Engine Controls

Single function operation with no compromise on durability and quality. These controls are machined from solid 6000 series aluminium, anodised for corrosion protection. Stainless steel shafts, fastenings and cylinder base are combined with hydraulic actuation, to provide true commercial reliability. Available in left and right hand configurations with choice of ball or T hand grip. Left and right lever units can be side by side mounted for twin engine installations. Suitable for connection to gear or throttle slave. Fully serviceable for extended operation life.

BLA Code	Hand	Lever	Mount mm	Height Base Console mm	Overall Above mm	Intrusion Width mm	Ports NPT
306610	Left	Ball	150 x 57	240	76	87	¼"
306612	Right	Ball	150 x 57	240	76	87	¼"
306614	Left	Black 'T'	150 x 57	208	100	87	¼"
306616	Right	Red 'T'	150 x 57	208	100	87	¼"

Refer next page for spare parts

Shift Slave

Machined from solid 6000 series aluminium, stainless steel and bronze for durability and reliability. Solid bronze internal gear mechanism, fully serviceable for extended life. This unit transfers the hydraulic force, created at the control, to rotary actuation at the gearbox via mechanical linkage. The slave is installed on the gearbox in close proximity to the gear linkage. The actuation arm can be rotated to any position relative to the shift. A roller positive detent mechanism provides solid feel and lock of gear in neutral position. Detent can also be rotated to any position relative to the shaft. Multiple mount holes on actuation lever provides for varying gear strokes.

BLA Code	Max Stroke mm	Slave Dim. mm	Torque kg cm	Mount Thread UNC	Ports NPT
306626	85	152 x 76 x 81	140	⅜"	¼"

Refer next page for spare parts

Throttle Slave

Machined from solid 6000 series aluminium, stainless steel and bronze for durability and reliability. Solid bronze internal gear mechanism, fully serviceable for long life. This unit transfers the hydraulic force, created at the control, to rotary actuation at the throttle linkage, via the rod connection. The slave is installed on the engine in close proximity to the throttle linkage. The actuating arm can be rotated to any position relative to the shaft. Multi tie rod mount holes on the actuation arm provide for varying throttle strokes.

N.B. The throttle slave must not be mounted to surfaces exceeding 100°c. If this is unavoidable the slave must be insulated from the heat.

BLA Code	Max Stroke mm	Slave Dim. mm	Torque kg cm	Mount Thread UNC	Ports NPT
306630	85	152 x 76 x 81	140	⅜"	¼"

Refer next page for spare parts

Reservalve

The Reservalve is generally installed in the boat's engine room in a vertical position with access for filling and inspection of system pressure and fluid level. The Reservalve acts as a fluid reservoir and pressure tank for the system. It incorporates a fluid level sight tube, pressure gauge, air pressurisation valve, over pressure relief valve, filter and charging valves. The pressure reservoir and charging valves maintain fluid to the back side of pistons. Fluid to and from the reservoir is regulated by the charging valve block on the bottom of the reservoir. The charging valve block is necessary to keep the system under pressure, and to prevent excessive pressures caused by the expansion of fluid with heat. A single Reservalve is used for both single and twin engine installations. All alloy pressure tank with stainless steel through bolt and valves. Charging valve assembly at base is machined from solid 6000 series aluminium.

BLA Code	Working Pressure bar	Capacity Litres	Height Holes mm	Width mm	Depth mm	Ports NPT	Mount mm
306634	5.5-5.75	4.2	435	160	185	¼"	7

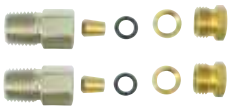
Accessories:

298412 Replacement filter element

Refer next page for spare parts

Engine Control Fitting Kit

All the components required to connect 5/16" O.D. nylon semi rigid tubing to the hydraulic engine controls. Kit connects two lines. All brass hardware.



BLA Code **306654**

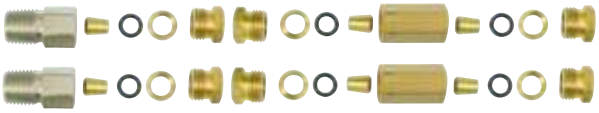
Reservalve Single Engine Fitting Kit

Includes all the plumbing components required to connect the R-13 Reservalve to 5/16" nylon semi rigid tubing in a single engine installation. Four black plugs are included to stop the ports normally used in twin engine applications. All brass hardware.

BLA Code **306640**

Extra Fittings Kit

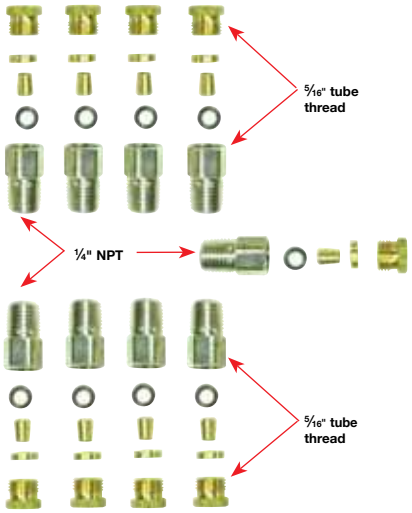
All the components required to connect 5/16" nylon semi rigid tubing in line, as well as connect to the 1/4" NPT ports used in SeaStar Solutions® hydraulic engine controls. Kit connects two lines. All brass hardware.



BLA Code **306666**

Reservalve Twin Engine Fitting Kit

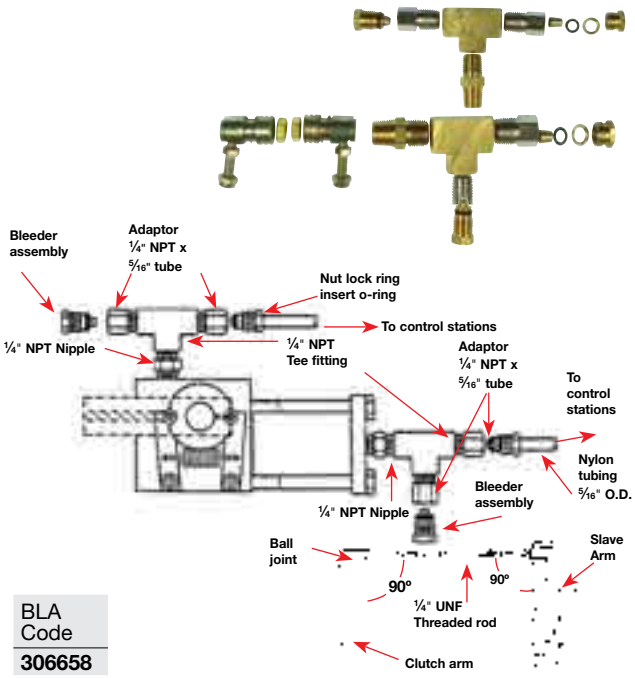
Includes all the plumbing components required to connect the R-13 Reservalve to 5/16" nylon semi rigid tubing in a twin engine installation. All brass hardware.



BLA Code **306642**

Shift Slave Fitting Kit

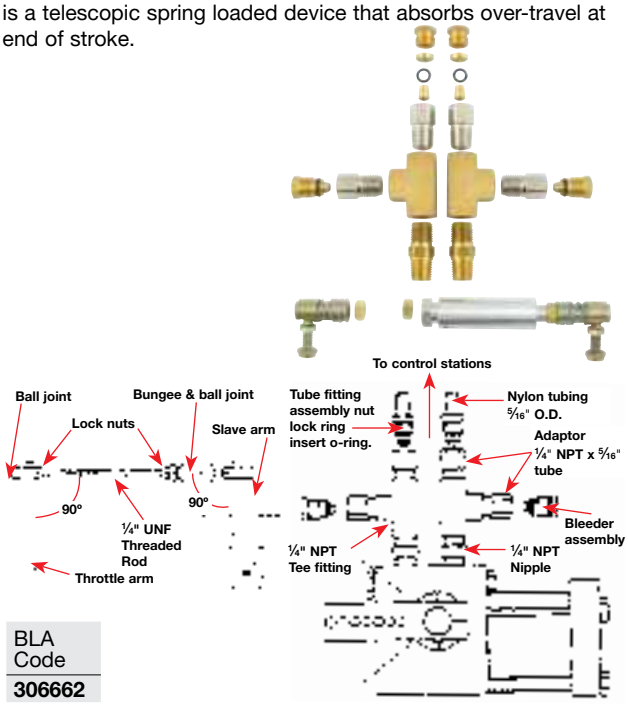
Kit includes all the plumbing connections and bleeders required to connect 5/16" O.D. nylon semi rigid tubing to shift slave **306626**. Also includes two ball joints for mechanical gear linkage.



BLA Code **306658**

Throttle Slave Fitting Kit

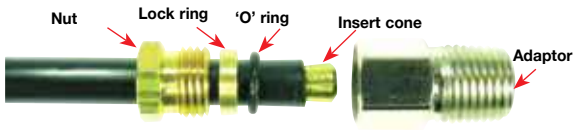
Kit includes all the plumbing connections and bleeders to connect 5/16" O.D. nylon semi rigid tubing to throttle slave **306630**. Also included is the two ball joints and bungee required for the throttle linkage. The bungee is a telescopic spring loaded device that absorbs over-travel at end of stroke.



BLA Code **306662**

5/16" OD Nylon Tube Fittings

SeaStar Solutions® hydraulic engine control components have ¼" NPT ports for connection of 5/16" O.D. nylon semi rigid tubing. No special tools required. All components except the 'o' ring are brass. Use loctite hydraulic sealant on all NPT fittings, do not use Teflon tape or pipe rope.



BLA Code	Description
298454	Insert cone
298480	Nut
298489	Adaptor ¼" NPT to 5/16" tube

In Line Connection Kit

Includes the components required for in line connection of 5/16" nylon semi rigid tubing. Brass hardware.

BLA Code
298314

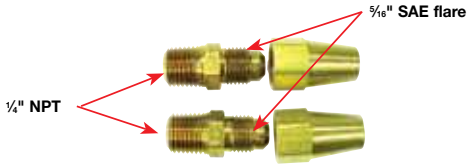
Nylon Semi Rigid Tube

Nylon semi rigid tubing is used to pipe the system for two reasons, ease of installation, and the fact that nylon tubing expands and contracts in very much the same manner as the hydraulic fluid (a most important factor). The expansion and contraction of the tubing reduces drift of the controls as temperature changes, thereby helping to keep all the components of the system synchronised. The tubing is virgin nylon, which has been heat and light stabilised and contains no plasticisers. The burst pressure of the tubing is in excess of 1200psi.

BLA Code	O.D. inch	Length m
306644	5/16"	30
306648	5/16"	150

5/16" Copper Flare Connectors

Kit comprises 2 x brass adaptors and 2 x brass tube nuts to connect 5/16" copper tubing to the ¼" NPT ports of SeaStar Solutions® hydraulic engine controls.



BLA Code
298422

Filter & Fitting Kit

Kit includes filter and housing to suit R-13 Reservalve. Also included are fittings for connection to 5/16" nylon semi rigid tubing.

BLA Code
298428

Glycol Fluid

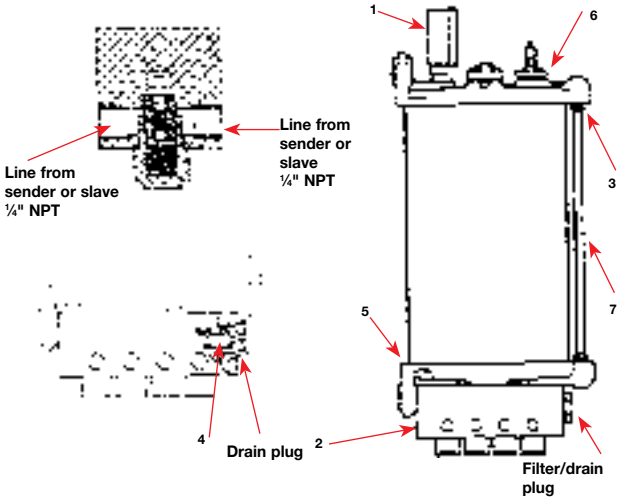
A 50/50 mixture by volume of distilled water and ethylene glycol, pre-filtered by a 10 micron filter. During filling of the system or servicing, it is essential that no contaminants enter the system. For this reason filtering of the fluid as it is poured into the system is recommended. This can be achieved by using filter paper in a funnel. If filter paper is not available, coffee filters are an alternative but first test their stability with the glycol solution. Not all ethylene glycol solutions are the same, some additives, especially silicone additives, are thicker in consistency and will clog the critical components in the system.

DANGEROUS GOODS

BLA Code	Capacity L
306676	4

R-13 Reservalve Parts

Spare parts to suit the R-13 Reservalve. For the hydraulic control parts, refer to page 850.



BLA Code	Item	Description	Qty No.
298412	4	Replacement filter element	1
298440	5	Quad ring seal 150mm dia	1
298504	6	Fill plug with air valve	1
298534	7	Fluid level sight tube	1

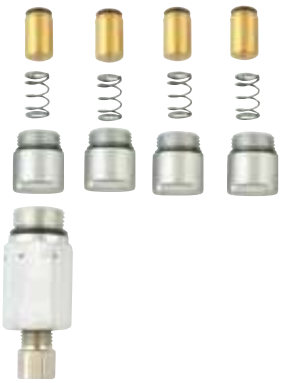
Bleeding Nipple

Brass nipple used in SeaStar Solutions® hydraulic engine control systems to bleed air during system purging. 5/16" tube thread with taper seat.

BLA Code
298514

Charging Valve Update Kit

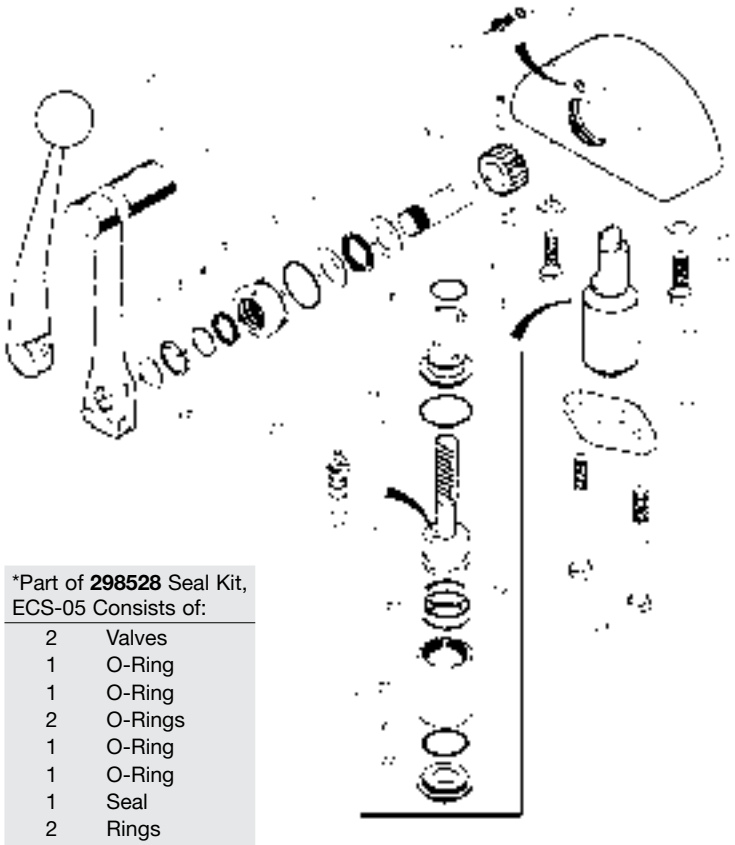
Due to problems resulting from contaminants entering early model Hydraulic Steering Systems, SeaStar Solutions® have developed this update kit consisting of four assemblies and reservoir filter/plug. The upgrade overcomes the issues of spongy feel and frequent purging requirements sometimes found in early hynautic hydraulic control systems. Suits pre 1990 MCV-04 charging valves.



BLA Code
298420

Hydraulic Control Parts

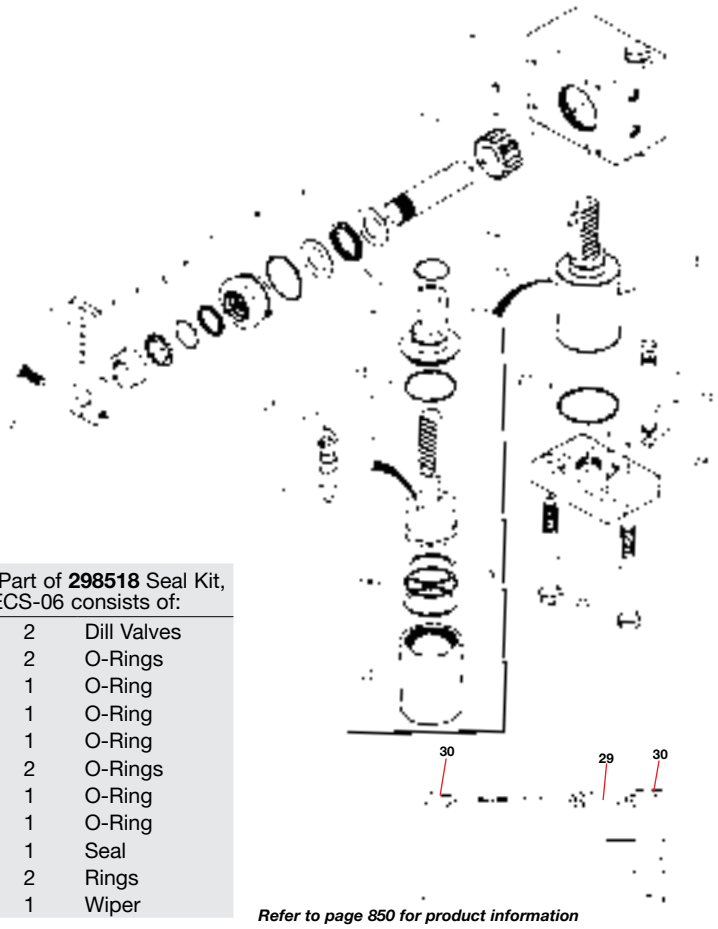
BLA Code	Item	Description	Qty No.
298444	1	'T' Handle (red)	1
298442	1	'T' Handle (black)	1
	2	Wiper*	1
	3	O-Ring*	1
	4	Quad seal*	1
298510	5	Bushing	1
	6	O-Ring*	1
298324	7	Bearing race	2
298328	8	Bearing	1
298492	9	Pinion assembly	1
	10	Body (CL-04)	1
		Body (CR-04)	1
	11	Screw	1
298332	12	Gasket*	1
	13	Cylinder assembly (CL-04)	1
		Cylinder assembly (CR-04)	1
	14	O-Ring*	1
	15	Cylinder end (CR-04)	1
		Cylinder end (CL-04)	1
	16	O-Ring*	1
	17	Piston assembly	2
	18	Teflon back-up ring*	1
	19	O-Ring*	1
298586	20	Cylinder tube	1
	21	O-Ring*	1
298398	27	Dill valve*	2
	28	Washer	1
298330	29	Ball black	1
298498	29	Ball red	1
298447	30	Lever with red ball	1
298448	30	Lever with black ball	1
298528	*	Seal kit	1



*Part of **298528** Seal Kit, ECS-05 Consists of:	
2	Valves
1	O-Ring
1	O-Ring
2	O-Rings
1	O-Ring
1	O-Ring
1	Seal
2	Rings
1	Gasket
1	Wiper

Throttle Slave Parts

BLA Code	Item	Description	Qty No.
	1	Lever Arm	1
	2	Screw	1
	3	Spacer	1
	4	Wiper*	1
	5	O-Ring*	1
	6	Quad Seal*	1
298510	7	Bushing	1
	8	O-Ring*	1
298324	9	Bearing Race	2
298328	10	Bearing	1
298490	11	Pinion Assembly	1
	12	Body	1
	13	Cylinder Assembly	1
	14	O-Ring*	1
	15	Cylinder End [Eccentric]	1
	16	O-Ring*	1
298494	17	Piston Assembly	1
	18	Teflon Back-Up Ring*	2
	19	O-Ring*	1
	20	Cylinder Tube	1
	21	Tube	1
298488	22	O-Ring*	2
	23	O-Ring*	1
	24	Plate	1
	25	Bolt	2
298400	26	Dill Valve (red)*	2
298334	29	Bungee	1
298320	30	Ball Joint	1
298518	*	Seal Kit	1

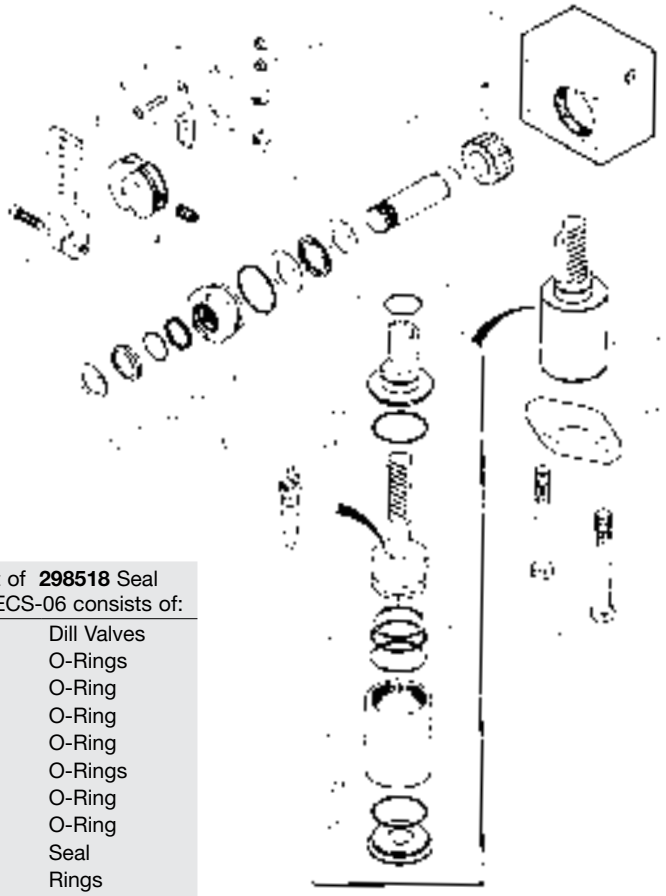


*Part of **298518** Seal Kit, ECS-06 consists of:	
2	Dill Valves
2	O-Rings
1	O-Ring
1	O-Ring
1	O-Ring
2	O-Rings
1	O-Ring
1	O-Ring
1	Seal
2	Rings
1	Wiper

Refer to page 850 for product information

Shift Slave Parts

BLA Code	Item	Description	Qty No.
	1	Lever Arm	1
	2	Screw	1
298587	3	Cam	1
	4	Setscrew	1
298396	5	Spring	1
	6	Screw	2
	7	Washer	2
298394	8	Detent Assembly	2
298326	9	Bushing	2
	10	Washer	1
	11	Wiper*	1
	12	O-Ring*	1
	13	Quad Seal*	1
298510	14	Bushing	1
	15	O-Ring*	1
298324	16	Bearing Race	2
298328	17	Bearing	1
	19	Body	1
	20	Cylinder Assembly	1
	21	O-Ring*	2
	22	Cylinder End [Eccentric]	1
	23	O-Ring*	2
298494	24	Piston Assembly	1
	25	Teflon Back-up Ring*	2
	26	Cylinder Tube	1
	27	Cylinder End	1
	28	Plate	1
	29	Bolt	2
298400	30	Dill Valve (red)*	2
298518	*	Seal Kit	1



*Part of **298518** Seal Kit, ECS-06 consists of:	
2	Dill Valves
2	O-Rings
1	O-Ring
1	O-Ring
1	O-Ring
2	O-Rings
1	O-Ring
1	O-Ring
1	Seal
2	Rings
1	Wiper

Refer to page 850 for product information

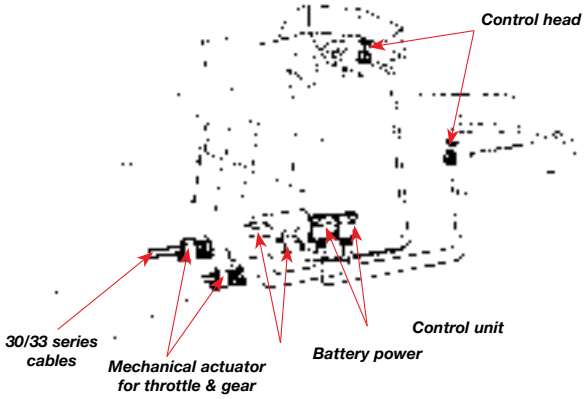
KE Electronic Engine Control Systems by NHK

NHK MEC

Electronic controls are designed for smooth, efficient and functional gear and throttle operation in new or retro-fit installations. They are suitable for use on most single or twin engine outboard, inboard or stern drive powered boats. KE electronic engine controls are available in 3 different configurations:

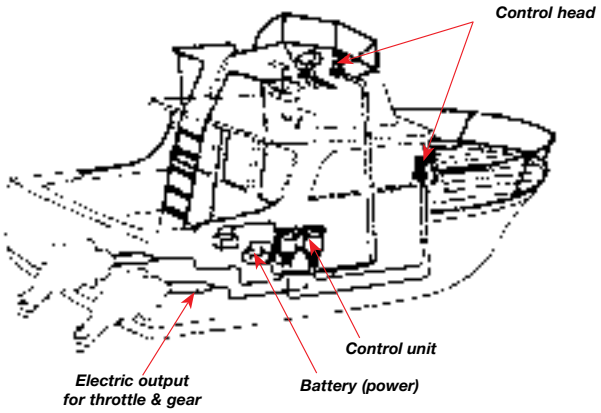
KE-4+:

Electronic engine control system to suit mechanically activated throttle and gear. Up to four station capability.



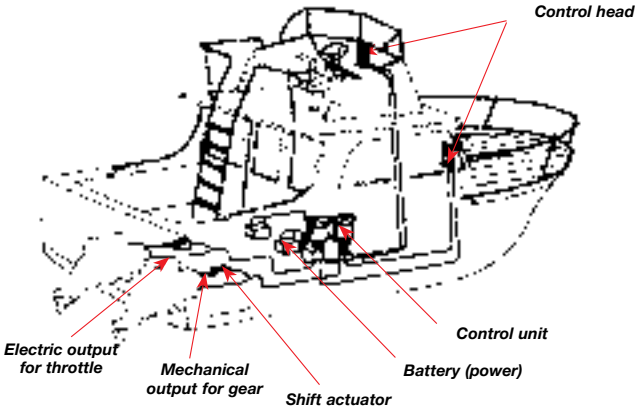
KE-5+:

Electronic engine control system to suit electronically actuated throttle and gear. Up to four station capability.



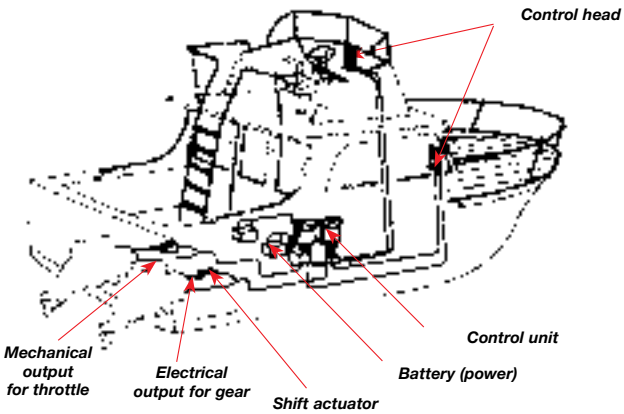
KE-6a:

Electronic engine control system to suit electronically actuated throttle and mechanically actuated gear. Up to four station capability.



KE-7:

Mechanical actuated throttle and electronically actuated gear (opposite of KE-6a) up to four stations capability



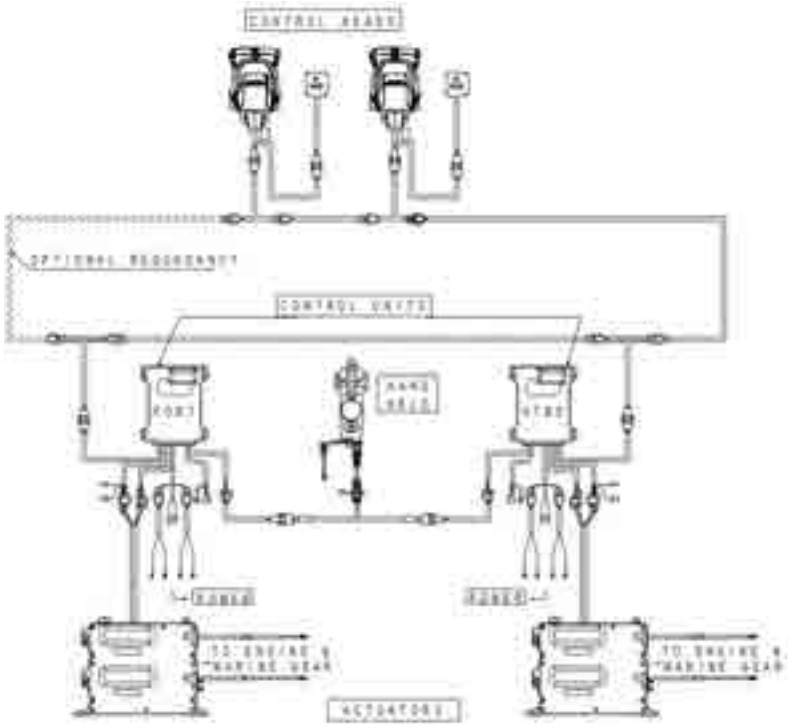
KE-4+ Electronic Control System For Boats with Mechanical Throttle and Mechanical Shift

NHK MEC

Designed for smooth, efficient and functional gear and throttle operation on boats with mechanical throttle and mechanical shift, the KE-4+ is the perfect answer for most control applications. The KE-4+ control system is ideally suited to a range of engine installations from single to quad with the additional capability of being able to be installed in up to four station applications. Designed specifically to meet the performance, reliability, endurance and aesthetic requirements of today's modern craft.

Main Features include;

- Neutral throttle provides throttle only operation to warm engines
- Control station select allows transfer from one control station to another by simply pressing the SEL button on any one of up to four control heads
- SYNC button allows multi engine speed synchronisation from any control head
- Safety SIGP feature allows engines only to be started in the neutral position
- Adjustable actuator settings provides easy travel matching for engine and gearbox combinations
- Designed for new installation or retrofit
- A new level of control performance for inboard, outboard or stern-drive engines in petrol or diesel
- Common 12/24 voltage in one unit
- Up to 4 stations
- For use from single to quad applications
- Synchronisation standard, 1 lever or 2 lever selection
- Complete self-diagnostic system
- Optional mechanical backup
- Adjustable shift pause and throttle delay
- Optional trolling system
- Optional remote hand held control. A great docking accessory
- Idle control option



Control Head

NHK MEC

Choose between traditional stainless steel single or dual lever operation or the new outboard styled levers with optional integrated power trim and tilt. All controls now include engine synchronisation and 12/24 volt adaptability as standard functions.

Simple single push button Auto-Sync fucntion

Standard controls available with or without power trim and tilt

305712

Optional stainless steel controls

305701

BLA Code	Control Type	Power Trim & Tilt
305700	Single Standard	No
305701	Single Stainless Steel	No
305702	Single Standard	Yes
305710	Twin Standard	No
305711	Twin Stainless Steel	No
305712	Twin Standard	Yes

Control Unit

NHK MEC

The electronic KE-4+ engine controls seamlessly combine with the dual voltage electronic control unit and actuator to provide smooth, efficient and functional gear and throttle operation in new or retro-fit installations. The electronic control unit features quick and easy interconnect CANbus connections reducing wiring and installation times. A built-in diagnostics window located above the DIP switch settings box provides a visual LED code which references the applicable problem.

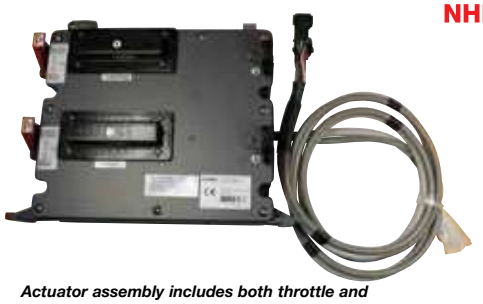
BLA Code	Description
305720	Control Unit

Actuator

NHK MEC

The throttle/shift actuator utilises cables such as the CCX633, CCX632, CC330 or CC230 to connect the actuator to the engine(s) throttle and gear linkages. Short length cables are recommended as the Actuator should be installed as close as possible to the engines. One throttle and one shift cable is required per engine. An optional mechanical backup system incorporated into the actuator provides a 'get home' function.

BLA Code	Description
305726	Actuator



Actuator assembly includes both throttle and shift actuators

Bus Harness

NHK MEC

NHK has simplified fit-up and reduced wiring weights by utilising CANbus harness technology throughout the KE-4+ system. A comprehensive instruction manual clearly outlines all interconnecting plug and play harnesses making installations easier and simpler.

BLA Code	Bus Harness Length m
306307	6
306309	8
306311	10
306313	12
306315	14
306317	16

BLA Code	Bus Harness Length m
306319	18
306321	20
306325	24
306333	40
306335	50

306307 Bus Harness

Power Supply Harness

NHK MEC

Connects the control unit to the batteries.
Harness available in two lengths.

BLA Code	Power Harness Length m
309955	5
309956	10

309955 Power Supply Harness

T-Harnesses

NHK MEC

A wide range of varying types and lengths to suit almost any engine and station combination are available including control harnesses, T-harnesses, harness extensions and trim circuit harnesses.

BLA Code	Description
305730	T-Harness R/C-1
305732	T-Harness R/C
305734	T-Harness Single
305736	T-Harness Port
305738	T-Harness Starboard

305732 T-Harness

Cable Control Type

NHK MEC

Cables such as CCX633, CCX632, CC330 or CC230 connect the actuator to the engine(s) throttle and gear linkages. Short length cables are recommended as the Actuator should be installed as close as is possible to the engines. One throttle and one shift cable are required per engine. See page 841 for details.

Idle Extension Harness

NHK MEC

A wide range of varying types and lengths to suit almost any engine and station combination are available including control harnesses, T-harnesses, harness extensions and trim circuit harnesses. Additional options include circuit breakers and warning buzzers. Whether you are fitting a single installation/single control or quad installation/quad control contact your Territory Manager for a complete overview and required components.

306348
Idel Extension harness

BLA Code	Description
306294	Idle Switch
306348	Idle Extension Harness
306350	Trim Circuit Harness
306361	Circuit Breaker 20A
306357	Buzzer 12V

Switches - Idle & Selector

For triple or quad installations the appropriate selector is required to allow full throttle and gear integration for all motors through the twin lever controls. The idle control switch is an optional extra which allows manual adjustment of the idle speed to be increased gradually to a maximum of 20% of full throttle.

BLA Code	Switch to suit
306290	Triple engine
306292	Quad engine
306294	Idle

Hand Held Remote To Suit KE-4+

An optional addition to the KE-4+ system, these remote controls allow the skipper to carry shift and throttle control about the boat when docking or manoeuvring in tight quarters. The hand held control features an ergonomic design with all the functionality of the fixed KE control head. Incorporates engine stop switch with lanyard and indicator light with warning functions. Single or twin engine controls are available. They have 8 metres of detachable cord (unless remote control harness is added to allow greater movement on board) and are supplied with a rubber mount bracket and one bulkhead connector, **306299**.

306299
Remote connector

BLA Code	Switch to suit
306298	Dual control
306299	Connector

306298
Optional dual remote control

Remote Hand Control Harness m	Control Head to Hand Remote Control Unit	Single Engine	Dual Hand
4	**306304**	1	2
6	**306306**	1	2
8	**306308**	1	2
10	**306310**	1	2
12	**306312**	1	2
14	**306314**	1	2
16	**306316**	1	2
18	**306318**	1	2
20	**306320**	1	2

KE-4+ Engine/Station Combination Requirements

NHK MEC

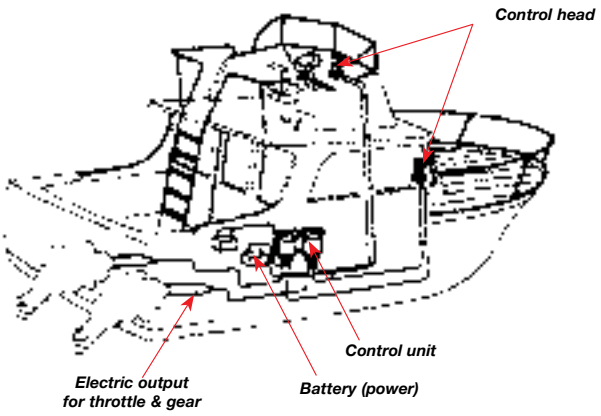
Description	BLA Code	Description	Required Items Single Engine No. of Stations 1st	2nd	3rd	4th	Required Items Dual Engine No. of Stations 1st	2nd	3rd	4th
Choose the Control Head	**305700**	Single Without PTT	1	2	3	4	-			
	305701	Single Without PTT S/S	1	2	3	4				
	305702	Single With PTT	1	2	3	4				
Choose the Control Head	**305710**	Dual Without PTT	-				1	2	3	4
	305711	Dual WIthout PTT S/S					1	2	3	4
	305712	Dual With PTT					1	2	3	4
Control Unit 12/24 VDC	**305720**		1				2			
Actuator	**305726**		1				2			
Bus Harness	**Control Head to Control Unit**		1	2	3	4	2	3	4	5
6m	**306307**									
8m	**306309**									
10m	**306311**									
12m	**306313**									
14m	**306315**									
16m	**306317**									
18m	**306319**									
20m	**306321**									
24m	**306325**									
30m	**306321**									
40m	**306333**									
50m	**306335**									
Power Supply 5m	**309955**		2				4			
Harness 10m	**309956**									
T-Harness R/C-1	**305730**		1				1			
T-Harness R/C	**305732**		-	1	2	3	-	1	2	3
T-Harness Single	**305734**		1				-			
T-Harness Port	**305736**		-				1			
T-Harness Starboard	**305738**		-				1			
Options										
Circuit Breaker 20A	**306361**	Optional	2				4			
Buzzer 12V	**306357**	Optional	1	2	3	4	1	2	3	4
Idle Switch	**306294**	Optional	1	2	3	4	1	2	3	4
Idle Extension harness	**306348**	Optional	1	2	3	4	1	2	3	4
Trim Cuircuit Harness	**306350**	Optional	-				1	2	3	4
Cable Control Type	33C- Length to be specified CCX633XX (XTREME™)		2				4			
Hand Held Remote	**306298**	Optional	Refer to page 868 for more information							

Note: For a complete system you must select 1 of each BLA Code in bold print

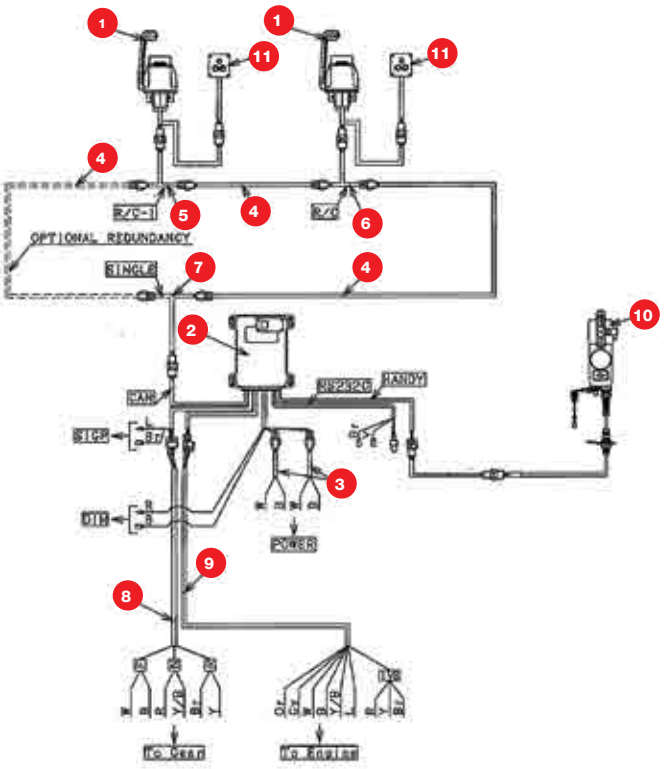
How to order the KE-5+ Electronic Engine Control System

NHK MEC

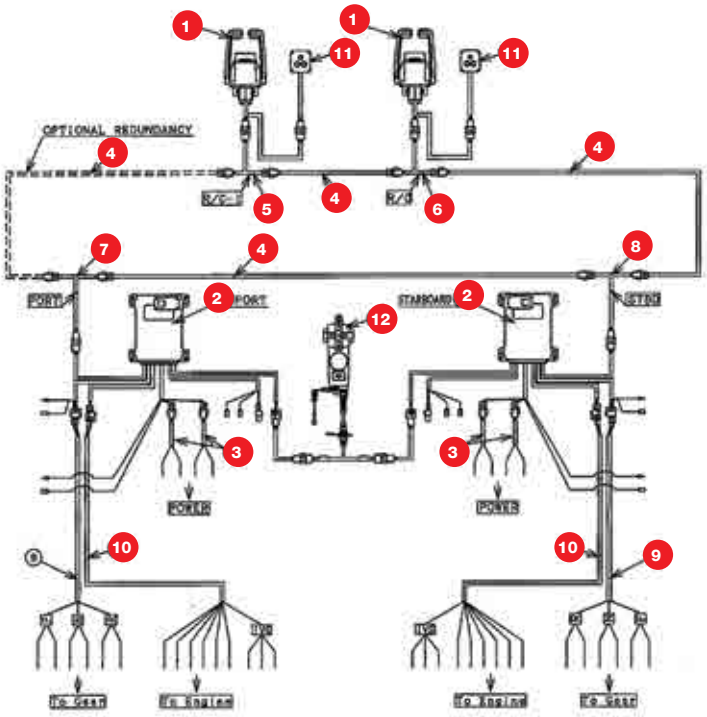
Electronic engine control system to suit electronically actuated throttle and gear. Up to four station capability, the KE-5+ Electronic Engine Control System is ordered in 12 different parts. To correctly specify a system from the guides below, you will need to know, the number of engines, number of stations and engine model information.



Single Engine Configuration



Dual Engine Configuration



N.B. For Triple and Quad applications contact BLA Sales on 1300 252 752.

NHK MEC Control Head

NHK MEC

The dual function, hand lever control unit that activates the operation of both gear and throttle functions. Supplied standard with a gold cover trim.

305701

BLA Code	Description	Component	Number
305700	Single Standard	Single Station	1
305701	Single Stainless Steel		
305710	Twin Standard	Dual Station	1
305711	Twin Stainless Steel		

NHK MEC Control Unit

NHK MEC

Electronic processor box with plug-in connectors for electric cables to connect control head(s), power supply and shift/ throttle harness.

BLA Code	Component Number	
	Single Station	Dual Station
306266	2	2

NHK MEC Power Supply Harness

NHK MEC

Connects the control unit to the batteries. Harness length available in 2 sizes.

309955

BLA Code	Harness Length	Component Number	
	m	Single Station	Dual Station
309955	5	3	3
309956	10		

Bus Harness

NHK MEC

NHK has simplified fit-up and reduced wiring weights by utilising CANbus harness technology throughout the KE-4+ system. A comprehensive instruction manual clearly outlines all interconnecting plug and play harnesses making installations easier and simpler.

306307 Bus Harness

BLA Code	Harness Length	Component Number	
	m	Single Station	Dual Station
306307	6		
306309	8		
306311	10		
306313	12		
306315	14		
306317	16	4	4
306319	18		
306321	20		
306325	24		
306333	40		
306335	50		

T-Harnesses

NHK MEC

A wide range of varying types and lengths to suit almost any engine and station combination are available including control harnesses, T-harnesses, harness extensions and trim circuit harnesses.

305702 T-Harness

BLA Code	Description	Component Number	
		Single Station	Dual Station
305730	T-Harness R/C-1	5	5
305732	T-Harness R/C	6	6
305734	T-Harness Single	7	
305736	T-Harness Port		7
305738	T-Harness Starboard		8

NHK MEC Harness KE-5A Shift

NHK MEC

306337

BLA Code	Harness Length	Component Number	
	m	Single Station	Dual Station
306337	5	8	9
306367	10		

NHK MEC Harness KE-5A Throttle

NHK MEC

306365

BLA Code	Harness Length	Component Number	
	m	Single Station	Dual Station
306365	5	9	10
306366	10		

Idle Extension Harness

NHK MEC

A wide range of varying types and lengths to suit almost any engine and station combination are available including control harnesses, T-harnesses, harness extensions and trim circuit harnesses. Additional options include circuit breakers and warning buzzers. Whether you are fitting a single installation/single control or quad installation/quad control contact your Territory Manager for a complete overview and required components.

306348
Idle Extension harness

BLA Code	Description	Component Number	
		Single Station	Dual Station
306294	Idle Switch	11	11
306348	Idle Extension Harness		
306350	Trim Circuit Harness		
306361	Circuit Breaker 20A		
306357	Buzzer 12v		
306359	Buzzer 24v		

Switches - Idle & Selector

NHK MEC

For triple or quad installations the appropriate selector is required to allow full throttle and gear integration for all motors through the twin lever controls. The idle control switch is an optional extra which allows manual adjustment of the idle speed to be increased gradually to a maximum of 20% of full throttle.

BLA Code	Description	Component Number	
		Single Station	Dual Station
306290	Triple Engine		
306292	Quad Engine		
306294	Idle	11	11

Hand Held Remote To Suit KE-4+

NHK MEC

An optional addition to the KE-4+ system, these remote controls allow the skipper to carry shift and throttle control about the boat when docking or manoeuvring in tight quarters. The hand held control features an ergonomic design with all the functionality of the fixed KE control head. Incorporates engine stop switch with lanyard and indicator light with warning functions. Single or twin engine controls are available. They have 8 metres of detachable cord (unless remote control harness is added to allow greater movement on board) and are supplied with a rubber mount bracket and one bulkhead connector, **306299**.

306299
Remote connector

306298
Optional dual remote control

BLA Code	Description	Component Number	
		Single Station	Dual Station
306298	Dual Control	10	12
306299	Connector		

Remote Hand Control Harness m	Control Head to Hand Remote Control Unit	Single Engine	Dual Hand
4	**306304**	1	2
6	**306306**	1	2
8	**306308**	1	2
10	**306310**	1	2
12	**306312**	1	2
14	**306314**	1	2
16	**306316**	1	2
18	**306318**	1	2
20	**306320**	1	2

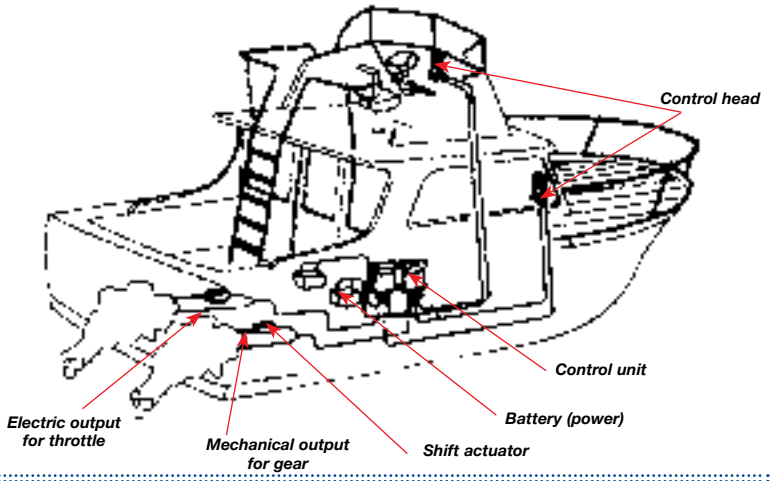
KE-5+ Engine/Station Combination Requirements

NHK MEC

Description		BLA Code	Description	Required Items Single Engine No. of Stations 1st	2nd	3rd	4th	Required Items Dual Engine No. of Stations 1st	2nd	3rd	4th
Choose the Control Head		305700	Single Without PTT	1	2	3	4	-			
		305701	Single Without PTT S/S	1	2	3	4				
Choose the Control Head		305710	Dual Without PTT	-				1	2	3	4
		305711	Dual WIthout PTT S/S					1	2	3	4
Control Unit 12/24 VDC		306370		1				2			
Bus Harness		Control Head to Control Unit		1	2	3	4	2	3	4	5
	2m	306303									
	4m	306305									
	6m	306307									
	8m	306309									
	10m	306311									
	12m	306313									
	14m	306315									
	16m	306317									
	18m	306319									
	20m	306321									
	24m	306325									
	30m	306321									
	40m	306333									
	50m	306335									
Power Supply	5m	309955		2				4			
Harness	10m	309956									
T-Harness R/C-1		305730		1				1			
T-Harness R/C		305732		-	1	2	3	-	1	2	3
T-Harness Single		305734		1				-			
T-Harness Port		305736		-				1			
T-Harness Starboard		305738		-				1			
Options											
Circuit Breaker 10A		306294	Optional	2				4			
Buzzer 12V		306357	Optional	1	2	3	4	1	2	3	4
Buzzer 24V		306359	Optional								
Idle Switch		306294	Optional	1	2	3	4	1	2	3	4
Harness Shift	5m	306337		1				2			
Harness Shift	10m	306367		1				2			
Harness Throttle	5m	306365		1				2			
Harness Throttle	10m	306366		1				2			
Hand Held Remote		306298	Optional								

How to order the KE-6a Electronic Engine Control System

Electronic engine control system to suit electronically actuated throttle and mechanical actuated gear. Up to four station capability. The KE-6a Electronic Engine Control System is ordered in 9 different parts. To correctly specify a system from the guides below, you will need to know, the number of engines, number of stations and engine model information.



Component 1: Choose Control Head

NHK MEC

NHK MEC Control Head

The dual function, hand lever control unit that activates the operation of both gear and throttle functions. Supplied standard with a gold cover trim.

BLA Code	Description
306252	Control head left hand
306254	Control head right hand
306256	Control head twin lever


306252

Component 2: Choose Control Unit

NHK MEC

NHK MEC Control Unit

Electronic processor box with plug-in connectors for control head(s), power supply and actuator(s).

BLA Code	Description
306271	Control unit KE-6A 12V
306275	Control unit KE-6A 24V

Component 3: Choose Actuator

NHK MEC

NHK MEC Actuator

The electrical/mechanical change over box. Supplied with a 350mm wiring harness that connects the actuator to the shift/throttle harness. Mechanical cables (purchased separately) are required to connect the actuator to the gear linkages.

BLA Code	Description
306259	Actuator Shift KE-6A

Component 4: Choose Communication Harness

NHK MEC

NHK MEC Communication Harness

Connects the 2 control units via the communication harness, which has a 10 pole coupler at each end for a dual engine system.

BLA Code	Harness Length m
306278	5

Component 5: Remote Control Harness

NHK MEC

NHK MEC Remote Control Harness

Connects the control head to the control unit. Available in lengths from 4 to 30 metres. Each lever on the control head requires a remote control harness, e.g a single lever control head requires one remote control harness, a twin lever control head requires two remote control harnesses. Select the lengths required from the table below.

BLA Code	Harness Length m
306304	4
306306	6
306308	8
306310	10
306312	12
306314	14

BLA Code	Harness Length m
306316	16
306318	18
306320	20
306324	24


306304-30

Component 6: Choose Harness Shift

NHK MEC

NHK MEC Harness KE-6A Shift

BLA Code	Harness Length m
306347	2

Component 7: Choose Throttle Harness

NHK MEC

NHK MEC Throttle Harness

Connects the control unit to the engine and transmission input/output.
Select the appropriate cable from the table below. Cable length is 5 metres.

BLA Code	Suits Engine	Output Type
306338	MAN, MTU	Current
306339	Cummins, Detroit, Scania, Iveco	Voltage
306340	Caterpillar	PWM

306338

N.B. In dual engine installations, the use of 306278/79/80 communications harness is recommended. Refer page 864

Component 8: Choose Power Supply Harness

NHK MEC

NHK MEC Power Supply Harness

Connects the control unit to the batteries. Harness length is 5 metres.

BLA Code	Harness Length m
309955	5

Component 9: Choose Additional Options

Options

Available options (detailed on pages 858)

Include:

- Buzzer
- Hand held remote control units
- Circuit breaker

Component 10: Choose Mechanical Control Cables

NHK MEC

NHK MEC Mechanical Control Cables

Cables such as CCX633, CCX632, CC330 or CC230 connect the actuator to the engine(s) throttle and gear linkages. Short length cables are recommended as the Actuator should be installed as close as is possible to the engines. One throttle and one shift cable are required per engine. See pages 841 for details.

For a complete KE-6a system you must select components from 1-8+ 11

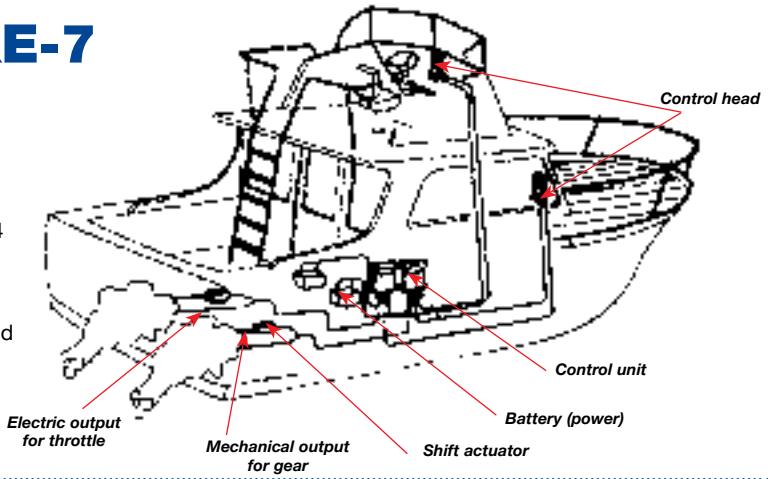
NHK MEC

No	Name		BLA Code	Required								Notes
				Single Engine				Two Engine				
				1st	2nd	3rd	4th	1st	2nd	3rd	4th	
1	Control Head		**306252**	1	2	3	4	-	-	-	-	
			306256					1	2	3	4	
2	Control Unit											
	24V model		**306275**	1	1	1	1	2	2	2	2	
	12V model		**306271**									
3	Shift Actuator		**306259**	1	1	1	1	2	2	2	2	
4	Communication Harness	5m	**306278**	-	-	-	-	1	1	1	1	
5	Harness,	4m	**306304**	1	2	3	4	2	4	6	8	For length other than those listed, consult BLA
	Remote	6m	**306306**									
	Control	8m	**306308**									
		10m	**306310**									
		12m	**306312**									
		14m	**306314**									
		16m	**306316**									
		18m	**306318**									
		20m	**306320**									
		24m	**306324**									
6	Harness Shift Act	2m	**306347**	1	1	1	1	2	2	2	2	
7	Harness, Throttle	Type 1 5m	**306338**	1	1	1	1	2	2	2	2	For current ouput
		Type 2 5m	**306339**									For voltage output
		Type 3 5m	**306340**									For PWM output
8	Power Supply	5m	**309955**	3	3	3	3	6	6	6	6	
	Harness	10m	**309956**									
9	Circuit Breaker	20A	**306361**	3	3	3	3	6	6	6	6	Option
10	Buzzer	12v Model	**306357**	1	2	3	4	2	4	6	8	Option
11	Push-pull mechanical cable			1	1	1	1	2	2	2	2	

Note: Refer to the previous page for componenet identification. Throttle harness based on the type of throttle output referring to the table above.

How to order the KE-7 Electronic Engine Control System

Electronic engine control system to suit mechanical actuated throttle and electrically actuated gear. Up to 4 station capability. The KE-7 Electronic Engine Control System is ordered in 9 different parts. To correctly specify a system from the guides below, you will need to know, the number of engines, number of stations and engine model information.



Component 1: Choose Control Head

NHK MEC

NHK MEC Control Head

The dual function, hand lever control unit that activates the operation of both gear and throttle functions. Supplied standard with a gold cover trim.

BLA Code	Description
306252	Control head left hand
306254	Control head right hand
306256	Control head twin lever


306252

Component 2: Choose Control Unit

NHK MEC

NHK MEC Control Unit

Electronic processor box with plug-in connectors for control head(s), power supply and actuator(s).

BLA Code	Description
306264	Control unit KE-7 12V
306267	Control unit KE-7 24V

Component 3: Choose Throttle Actuator

NHK MEC

NHK MEC Throttle Actuator

The electrical/mechanical change over box. Supplied with a 350mm wiring harness that connects the actuator to the throttle harness. Mechanical cables (purchased separately) are required to connect the actuator to the throttle linkages.

BLA Code	Description
306262	Actuator Shift KE7

Component 4: Choose Communication Harness

NHK MEC

NHK MEC Communication Harness

Connects the 2 control units via the communication harness, which has a 10 pole coupler at each end for a dual engine system.

BLA Code	Harness Length m
306278	5

Component 5: Choose Remote Control Harness

NHK MEC

NHK MEC Remote Control Harness

Connects the control head to the control unit. Available in lengths from 4 to 30 metres. Each lever on the control head requires a remote control harness, e.g a single lever control head requires one remote control harness, a twin lever control head requires two remote control harnesses. Select the lengths required from the table below.

BLA Code	Harness Length m
306304	4
306306	6
306308	8
306310	10
306312	12
306314	14

BLA Code	Harness Length m
306316	16
306318	18
306320	20
306324	24


306304-30

Component 6: Choose Power Supply Harness

NHK MEC

NHK MEC Power Supply Harness

Connects the control unit to the batteries. Harness length available in 2 sizes.

BLA Code	Harness Length m
309955	5
309956	10

309955

Component 7: Choose Actuator Harness

NHK MEC

NHK MEC Actuator Harness

The actuator harness is 2 metres in length and connects to the control unit.

BLA Code	Harness Length m
306349	2

Component 8: Choose Harness Shift

NHK MEC

NHK MEC Harness KE-7 Shift

Connects power to the marine gear solenoid.

BLA Code	Harness Length m
306351	5

Component 9 - 10: Choose Additional Options

Options

Available options (detailed on pages 858)

Includes:

- Buzzer
- Hand held remote control units
- Circuit breaker

Component 11: Choose Mechanical Control Cables

NHK MEC

NHK MEC Mechanical Control Cables

Cables such as CCX633, CCX632, CC330 or CC230 connect the actuator to the engine(s) throttle and gear linkages. Short length cables are recommended as the Actuator should be installed as close as is possible to the engines. One throttle and one shift cable are required per engine. See page 841 for details.

For a complete KE-7 system you must select components from 1-8 + 11

NHK MEC

No	Name		BLA Code	Required								Notes
				Single Engine				Two Engine				
				1st	2nd	3rd	4th	1st	2nd	3rd	4th	
1	Control Head		**306252**	1	2	3	4	-	-	-	-	
			306256					1	2	3	4	
2	Control Unit											
	24V Model		**306267**	1	1	1	1	2	2	2	2	
	12V Model		**306264**									
3	Throttle Actuator		**306262**	1	1	1	1	2	2	2	2	
4	Communication Harness	5m	**306278**	-	-	-	-	1	1	1	1	
5	Harness,	4m	**306304**	1	2	3	4	2	4	6	8	For length other than those listed, consult BLA
	Remote	6m	**306306**									
	Control	8m	**306308**									
		10m	**306310**									
		12m	**306312**									
		14m	**306314**									
		16m	**306316**									
		18m	**306318**									
		20m	**306320**									
		24m	**306324**									
6	Power Supply Harness	5m	**306347**	2	2	2	2	4	4	4	4	
7	Actuator Harness	2m	**306349**	1	1	1	1	2	2	2	2	For current ouput
8	Shift Harness,	5m	**306351**	1	1	1	1	2	2	2	2	
9	Circuit Breaker	20A	**306361**	2	2	2	2	4	4	4	4	Option
10	Buzzer	12v Model	**306357**	1	2	3	4	2	4	6	8	Option
11	Push-pull mechanical cable			1	1	1	1	1	2	2	2	

Note: Refer to the previous page for balloon references

NHK MEC KE Handheld Remote Control

NHK MEC

An optional addition to the KE system, these remote controls allow the skipper to carry shift and throttle control about the boat when docking or manoeuvring in tight quarters. The hand held control features an ergonomic design with all the functionality of the fixed KE control head. Incorporates engine stop switch with lanyard and indicator light with warning functions. Single or twin engine controls are available. They have 8 metres of detachable cord (unless remote control harness is added to allow greater movement on board) and are supplied with a rubber mount bracket, and one bulkhead connector, **306299**.

On single engine remotes, one remote control harness **306304-30** (listed below), is required to connect the bulkhead connector **306299**, to the control unit. On twin engine remotes, two remote control harnesses **306304-30**, are required to connect the bulkhead connector **306299**, to the control units.


306299


306304-30


306298

BLA Code	Description	Length m
306298	Remote control dual engine	10
306299	Additional bulkhead connector	15

NHK MEC KE Components / Accessories & spare parts

NHK MEC


306252


306256


306259


306260


306268


306274


306276


306278


306288


306304-30


306342


306354


306374


306378


306384-87


309955

BLA Code	Description	KE-4	KE-5	KE-6
306252	L/H, single lever control (gold)	✓	✓	✓
306254	R/H, single lever control (gold)	✓	✓	✓
306256	Twin lever control (gold)	✓	✓	✓
306259	Shift actuator	✗	✗	✓
306260	Throttle/shift actuator	✓	✗	✗
306268	Control unit KE-4 12v	✓	✗	✗
306273	Control unit KE-6 24v	✗	✗	✓
306274	Synchronisation slave harness	✓	✓	✓
306276	Synchronisation master harness	✓	✓	✓
306278	Communication harness 5m	✓	✓	✓
306279	Communication harness 10m	✓	✓	✓
306280	Communication harness 15m	✓	✓	✓
306282	Synchronisation switch harness 5m	✓	✓	✓
306284	Synchronisation switch harness 10m	✓	✓	✓
306286	Synchronisation switch harness 15m	✓	✓	✓
306288	Synchronisation switch	✓	✓	✓
306298	Remote control dual	✓	✓	✓
306299	Bulkhead connector	✓	✓	✓
306304	Remote control harness 4	✓	✓	✓
306306	Remote control harness 6	✓	✓	✓
306308	Remote control harness 8	✓	✓	✓
306310	Remote control harness 10	✓	✓	✓
306312	Remote control harness 12	✓	✓	✓
306314	Remote control harness 14	✓	✓	✓
306316	Remote control harness 16	✓	✓	✓
306318	Remote control harness 18	✓	✓	✓
306320	Remote control harness 20	✓	✓	✓
306324	Remote control harness 24	✓	✓	✓

BLA Code	Description	KE-4	KE-5	KE-6
306334	Shift/throttle harness (Cummins, Detroit, Scania, Iveco)	✗	✓	✗
306360	10A circuit breaker	✗	✓	✗
309923	Actuator terminal	✓	✓	✓
309955	Power harness 5m	✓	✓	✓

i6800 Electronic Control System

The i6800 system delivers precise control of a boat's shift and throttle functions. The actuators link to the control head through a single CANbus harness - for easy routing and fast installation. Adding multiple control stations is easy by adding a single harness.

All i6800 system kits come with all components needed for an installation, including power harness, and 30 feet of network harness. The i6800 electronic control system delivers an improved level of throttle control that makes it easier to handle your boat.

NOTE: Control cables ordered separately.

Applications:

- Suitable for all engines with mechanical shift and mechanical throttle
- Single or twin engine applications
- Inboards, IO's and Outboards
- Supports up to three stations

Features:

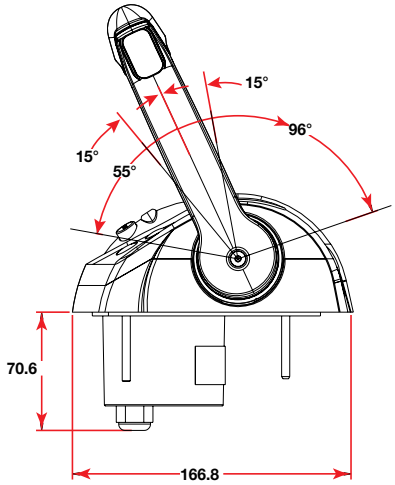
- Optional independent trim switches (**292400**)
- Adjustable control lever drag and detent settings
- Works on 12v systems
- Trolling mode
- Utilises standard 33c type control cables – XTREME type recommended
- Dual engine RPM synchronisation for single handle operation
- Incorporates neutral start protection
- Neutral warm-up
- Mechanical override "get home" feature
- Programmable shift delay
- Meets: ABYC P-24 CE EN 60945

Information Required to Specify a System

- Number of Engines (1 or 2)
- Number of Stations
- Independent trim switch required (yes or no)
- Length of Control Cables

305406

305414



292400
Trim Switch

305455
Shift and Throttle Acuator

Order Information

BLA Code	Complete Systems	Additional Stations
305540	Single Engine	**305550**
305542	Single Engine with Trim	**305552**
305544	Dual Engine	**305554**
305546	Dual Engine with Trim	**305556**
292400	Tilt/Trim Switch (Independent)	-

SeaStar Solutions® i6800 Systems Matrix

Base Systems - Single Station Kits	BLA Code	305540 Single Engine	305542 Single Eng. W/Trim	305544 Dual Eng.	305546 Dual Eng. W/Trim
Actuators					
Actuator, i6800 universal	**305455**	2	2	4	4
Control Head Kits					
Single Top Mount, Control Head kit	**305404**	1	-	-	-
Single Top Mount, Control Head kit with Trim	**305406**	-	1	-	-
Dual Top Mount, Control Head kit	**305408**	-	-	1	-
Dual Top Mount, Control Head kit with Trim	**305414**	-	-	-	1
Optional Accessories					
Dual trim switch panel for independent operation	**292400**	-	-	-	-
Harnesses/Tees					
Power Harness (25ft)	**305480**	1	1	2	2
NMEA Comm kit (2tees, 1 male and 1 female terminator)	**305494**	1	1	1	1
Single CANbus Tee	**305492**	1	1	3	3
Choose CANbus Size Based on Application					
Micro C Ext, M-F (6ft CANbus harness)	**292280**	1	1	1	1
Micro C Ext, M-F (12ft CANbus harness)	**292284**	1	1	1	1
Micro C Ext, M-F (20ft CANbus harness)	**292288**	1	1	1	1

SeaStar Solutions® Additional Stations Systems Matrix

Additional Stations	BLA Code	305550 Single Engine	305552 Single Eng. W/Trim	305554 Dual Eng.	305556 Dual Eng. W/Trim
Control Head Kits					
Single Top Mount, Control Head kit	**305404**	1	-	-	-
Single Top Mount, Control Head kit with Trim	**305406**	-	1	-	-
Dual Top Mount, Control Head kit	**305408**	-	-	1	-
Dual Top Mount, Control Head kit with Trim	**305414**	-	-	-	1
Harnesses/Tees					
Single Tee	**305492**	1	1	1	1
Micro C Ext, M-F (30ft CANbus harness)	**292290**	1	1	1	1

N.B. Control cables ordered separately requires EST display setup tool for configuration 305482.

Single Engine