

Dockside Transformers for Ship Refits

Major refits are carried out on all Royal Naval Warships and Submarines on a planned basis, to ensure they are ready and able to undertake the multiplicity of tasks the UK Navy carries out around the world.

When a major refit takes place, temporary power and lighting has to be installed throughout the vessel, as the fixed power and lighting is out of service during the refit. Although this is a temporary installation, a major refit can take 12 months or more to complete and the equipment must be able to endure harsh operating conditions over an extended period and also be capable of being used on many refits over a period of years.

The Blakley Electrics Project Team has recently completed a contract for 6 no. 41.25 kVA Dockside Transformers, which are to be used exclusively for Royal Navy ship refits. The assemblies have been specifically designed to withstand the arduous physical conditions and highly corrosive atmosphere encountered in this environment, as well as meet the stringent electrical safety requirements outlined below.

All temporary lighting and most power tools used on a refit operate at 110 volts. In addition, there is also a requirement for a maximum voltage to earth of 55V, which precludes the use of a conventional three-phase Reduced Low Voltage (RLV) site transformer, where a line to earth voltage of up to 63.5V is permitted. Due to the long 110V cable runs and the prevalence of conductive materials across most vessels, RCD protection is also required to ensure that earth leakages can be cleared well within the 5 seconds designated in the 17th Edition Wiring Regulations for RLV circuits. The multi layered 110V reticulation system used on the vessel requires adjustable, selective RCDs to be fitted in the Dockside Transformers to ensure discrimination with downstream RCDs.

To withstand the salt laden atmosphere and harsh operating conditions, these high specification assemblies utilise purpose built, non-vented, IP55 enclosures made from grade 316L stainless steel, finished with a conspicuous top coat. To protect the enclosure structure from physical damage, it is mounted within a heavy duty crash frame, which also provides a safe method of moving these 620kg assemblies, whether by fork lift or crane.

To enable the supply to the transformer be plug-in, a 63A 5P 400V appliance inlet is fitted, which can be connected by extension lead to a 63A, 400V socket. The transformer has a reduced inrush current, to minimise the likelihood of tripping the MCCB protecting the 63A supply socket on initial energisation. The transformer has a low (2.6%) impedance voltage to help ensure sufficient short circuit current is created to operate the output MCCBs should a line to line fault occur. To help off-set volts drop, the primary winding incorporates tapings, which can be selected via an off-load manual tap changing switch, which is located at the front of the assembly, behind a lockable hinged cover. An incoming isolator is also fitted.

The transformer has a three-phase, delta connected primary and a hex phase connected output with three secondary windings (Dy11y5). This arrangement has the benefit of providing three 110V CTE single phase supplies (55-0-55V) from a single three phase incoming supply.

The transformer output feeds 3 no. 125A, 110V, IP67 sockets, each protected by a 125A MCCB with under volt release and Vigirex adjustable earth leakage protection.

PTO for more images and drawings of these assemblies. If you would like to discuss a similar requirement, please contact our Special Projects team.



Transformer, 41.25 kVA - Distribution Door Closed



Various images of the 41.25kVA Dockside Refit Transformers with close-ups of the manual tap changing switch, the outgoing MCCBs with Vigirex RCD protection and the protective cowl around the sockets.

A dimensioned drawing is at the foot of the page. The overall weight is 620kgs per transformer.

