

Solutions Brief

## Compact starters provide space-saving advantage for membrane systems in wastewater applications.

A Northern German company in Neumünster specializes in the production of membrane systems for the clarification of wastewater from various applications such as landfill sites and biogas plants. As these systems are installed inside containers, space is very limited. Therefore, the electrical equipment components should be as small as possible. In consideration of limited space, compact starters have been employed to control the various processes. The company is an expert in environmental technology and plant engineering, specializing in biogas technology, landfill site process engineering and power engineering. The company has been working on the continuous improvement of procedural workflows for roughly three decades. For example, its membrane systems are employed for the treatment of leachate from landfill sites and wastewater from biogas plants. The systems operate on the basis of the reverse osmosis principle: From operating pressures of approximately 10 bar, the natural physical diffusion process on a membrane is reversed and thus made usable for clarification. The contaminated water is transported

through various levels by means of pumps. As of lately, the corresponding motors have been controlled via modern SIRIUS 3RA6 compact starters by Siemens. This step towards modernizing the electrotechnical equipment of the purification systems accommodated in the containers reflects the future orientation of the company's facility.

As their name already suggests, 3RA6 compact starters are compact and help to ease the systems' construction and operation.

### Three functions in one enclosure

Each enclosure combines the three functionalities of an MSP, a contactor and a solid-state overload relay (thus featuring all motor starting functions). This simplification alone already facilitates reduced planning, procurement, mounting and wiring efforts. The direct-on-line or reversing starters all come in the same height and remain in line when mounted in control cabinets. This allows for the combination of clearly structured and compact drive blocks. The 3RA6 devices are mounted



The membrane systems must be accommodated for in the narrow containers. The electrotechnical equipment must feature a "slim" design.

on a specifically developed infeed system, which can however also be used or combined with other Siemens devices (e.g. SIRIUS 3RV circuit breakers) or infeed systems (i.e. 3RV29 infeed system). Installation costs and time is significantly reduced by using the 3RV29 infeed system. Furthermore, an integrated PE bar allows for the drives' direct connection to the 3RA6 devices. The elimination of the otherwise required coupling level supports additional savings in terms of wiring costs and space.

### Optional control via AS-interface

The company also opted for a modern version of the control of these compact starters, thereby reducing an additional coupling level for contactor control. A connection for AS-Interface can also be optionally plugged onto the lower end of the 3RA6 devices. This AS-i add-on module in A/B technology is even available with two local inputs for fail-safe disconnection. Since AS-i controlled the valves employed in process engineering, it also made sense to use it in the membrane system. This communication procedure facilitates the compact starters' integration in the control system with minimum programming.

### Easy installation and replacement

With only five wide setting ranges up to a rated current of 32 A and two control voltage ranges for 24 V and 110-240 V, AC/DC, the compact starters are user-friendly with regard to the product version and costs. For this reason, the company requires merely three device types for coverage of the employed performance range. This results in reduced costs with respect to selection, ordering and spare parts.

In the event of a change in service assignments, the use of 3RA6 compact starters provide reduced effort. Only the previous setting values have to be transferred to the new device via the device front. The current value is adjusted via a rotary knob. Subsequently, the old device can be pulled off towards the front and the new device can be slid on. Such replacement takes next to no time without having to disconnect the voltage supply, which allows for considerable time savings and significantly minimized service assignments. Thanks to the removable terminal blocks, wiring faults are also a thing of the past. Due to the

integrated diagnostics options, a required replacement is signaled long before an actual failure. If the main contacts show respective erosion after long application periods and threaten to bond, they are mechanically separated with great force. This is detected by the device, which initiates a corresponding signal to facilitate the timely planning of maintenance. Imminent replacement is directly indicated on the device or can be transmitted to the control via evaluation of the short-circuit signaling contact. Also, system modifications and expansions can be easily accomplished with compact starters. In many cases, the number and scope of additionally required consumers is already known in advance. A correspondingly higher number of slots should then be provided for in the 3RA6 infeed system. Carrier plates with two and three slots are available. If this additionally required space is configured from the start, future adjustments can be carried out in minimum time – particularly also on site. Engineers know all too well that service technician hours on the construction site are considerably more cost-intensive than workshop hours.

### Important detailed information prior to commissioning

The compact starter's rapid and flexible adjustability to various application cases represented one of the main requirements within the scope device development. Therefore, the motor start-up overload protection function can be individually set between Class 10 and 20 via a sliding lever. Test buttons for overload release and short-circuit release represent further elements for smooth commissioning. In addition, the release type can be signaled to the control via separate auxiliary switches.

### Functionality generates future-proof operation

The company has successfully taken advantage of the SIRIUS 3RA6 compact starters benefits for its membrane systems. The three-in-one functionality not only saves space inside the control cabinet, but also considerably reduces wiring and labor costs. This electrotechnical solution is supplemented by numerous diagnostics options prior to commissioning and during operation. This facilitates intelligent and future-proof operation, both from the system manufacturer's point of view and its operators.

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