

ASri™

THE INTELLIGENT CRUSHER CONTROL SYSTEM



Sandvik Rock Processing



take advantage of **OUR EXPERIENCE**

CRUSHING ROCKS WITH YOUR PC

Whilst the basic machinery used in rock processing has remained fundamentally unchanged for 70 years, the industry has nevertheless become considerably more hi-tech. You may not be able to crush a rock with your PC, but you can certainly use advanced technology to ensure that crushers are performing optimally, that your product quality is consistent and high, and that machinery downtime is minimized.

SANDVIK ROCK PROCESSING HAS BEEN DOING IT FOR YEARS

For over 100 years we have been making crushers, and for 30 of those, we have also been developing crusher control system to optimise the performance of our crushers. Our very first automation system came onto the market in 1967 and we have delivered over 3000 units around the world to date. The crushing system family has grown to include ASR1, ASR2, ASRC, ASRplus and now... our very latest technology in this area – the ASRi™*.

WE CALL IT “INTELLIGENT”

The reason why we call ASRi an “intelligent” crushing system, is that it helps you not only to monitor operations, but over time enables you to get to know your crushing equipment so well, that you can truly optimise its usage whilst protecting it from damage.

Regardless of whether yours is a simple one-crusher operation, or a larger, more complex plant, the ASRi can help you improve results. It is up to you to choose which of the systems functions you use, how frequently and to what capacity. This is what makes the system not only intelligent but supremely flexible.

So if you are already using an earlier generation of crusher control system, maybe it is time to upgrade? And if you're not using a crusher control system yet, maybe it's time to start?

*Patent pending

WHEN YOUR JOB gets tougher, ASRi™ lightens the load

INCREASING CUSTOMER SATISFACTION

The ASRi system automatically controls your crusher and protects it from damaging overloads. It helps to increase production, get the highest possible degree of reduction, improve product distribution and get better product shape. All this increases your company's ability to consistently satisfy your own customers.

MINIMISING DOWNTIME

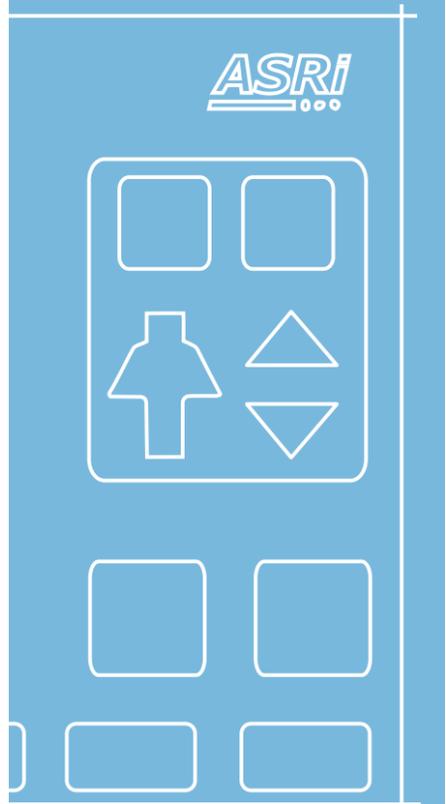
At the same time, controlling your crushers with the new ASRi system will reduce your own headaches at work; it provides you with an excellent overview of operations at a glance, and enables you to act early to prevent damage to the crusher and avoid the resulting production stoppages. The more information you have, the more control you have over your operations, with all the benefits that entails. ASRi gives you that control.

MAKING LIFE EASIER

Apart from its new features and refined functionality, the main characteristic distinguishing ASRi from previous generations of crushing systems is its greatly increased user-friendliness. For quick set-up and easy installation the system incorporates a graphic presentation of cables and transducers so that you can check the connections. Once installed, everything from ASRi's simple, colour graphics and touch screen interface to the built-in instruction manual and numerous automated functions, has been developed with you, the user, continually in focus. ASRi helps make your production smoother and more efficient and saves you time and trouble, both now and in the long run.

MEETING THE INDUSTRY'S TOUGH DEMANDS

Trends in the rock processing industry are towards increased automation, with all players continually aiming for increased efficiency, better product and cost reduction. ASRi increases your ability to meet these tough demands. Not only can you get better control over operations, but at the same time you can greatly reduce the need to expose yourself and your employees to potentially dangerous, unhealthy environments.





new features OF ASRi™

MORE ADVANCED SENSOR

A more advanced sensor is used to measure the pressure at which the crusher operates, and the results are processed according to a more comprehensive mathematical method. This leads to a more accurate indication of how well the crusher is performing and helps you to optimise the crushing force. It also protects the crusher from overloads and thus helps prevent stoppages.

CRUSHING PROGRAMS:

ASRi allows you to tailor special crushing programs for your operations, and up to twenty different programs can be stored. For each program, you can choose between three different regulation modes:

AUTO-CSS™ REGULATION MODE

By keying a CSS set point into ASRi you can keep the crusher running at the same setting unless an overload occurs. (In that case it will open the crusher and return the mainshaft to the desired position when the load reverts to normal).

AUTO-LOAD™ REGULATION MODE

In this case, ASRi regulates the setting so that the crusher operates at a certain desired load level. If you select the highest permitted load level, the CSS will always be the smallest possible, resulting in maximum reduction.

MULTI-CSS™ REGULATION MODE

ASRi's new "Multi-CSS mode" is an improved Auto-Cycle function enabling you to switch between two different settings to give two different product curves. Switching takes place on a time-share basis so the end product contains the desired proportions of both finer and coarser materials.

INFORMATION ACCESS

The ASRi gives you easy access to various types of information to help you understand what has happened during crushing operations, be it problems requiring urgent attention or information to account for fluctuations in productivity over time.

ALARMS: An alarm system monitors transducer signals and internal values. If an alarm has been registered, the traffic light symbol on screen will show red or yellow. You can click on screen to view more details about the nature of the alarm. When the fault has been corrected, it will automatically disappear from the list. However, it will remain in the Alarm Log for future reference.

EVENT LOG: This is continuously up-dated to give you a record of changes made in the ASRi system and in the crusher's operation.

OPERATING DATA: You can get an instant picture of the current operating values for power draw, Hydroset pressure and CSS. This function differs from the normal screen picture in that the information is given as curves for the latest thirty seconds of operation.

HISTORICAL DATA: You can get an historic picture of the crusher's operating values for e.g. power draw, Hydroset pressure and CSS.

There are four different resolutions to choose between, depending on what you want to study. With the highest resolution you get a detailed picture of the latest hour; with the lowest resolution you can view data as far as four weeks back, which makes this a very useful diagnostic tool.

EASY COMMUNICATION WITH OTHER SYSTEMS

ASRi can communicate with a higher-level system by way of a 100 Mbit Ethernet connection, and to other ASRi systems through a 10 Mbit Ethernet connection. (Add a gateway and you can even communicate with existing ASR Plus systems in the plant).

A serial port permits communication with Winplus or other PC programs.

In addition the software program WINi™ can be used to connect your ASRi to a central computer. This makes it easy to rapidly switch between viewing the different crushers at your plant using a normal PC, leading to a clear, fast overview of your whole operation.

POT™

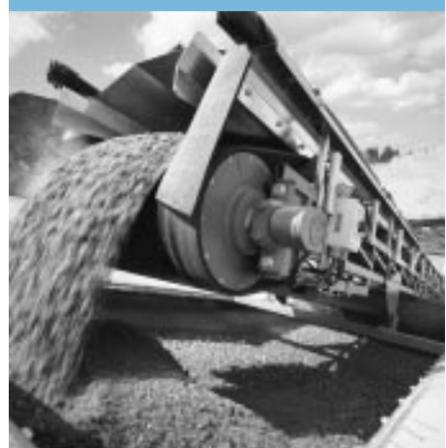
The Process Optimization Tool is one of the most innovative features of ASRi, and although built into ASRi, can be used without interfering in the crusher's normal operations. If you carry out laboratory tests on your crusher products, you can key in the results of these tests to your ASRi. The POT feature will then enable you to predict what product curves and product qualities you will obtain at different crusher settings. You can also study the effect of a setting setpoint change, or anticipate the consequences of switching between different feed materials.

SIMPLER CALIBRATION

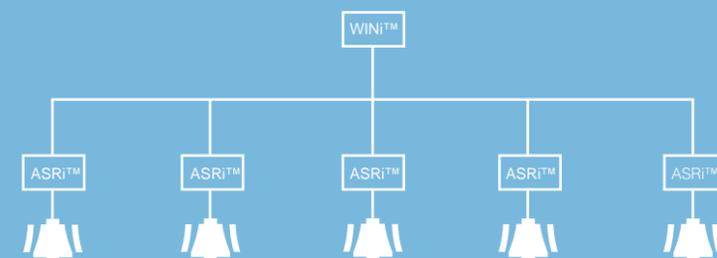
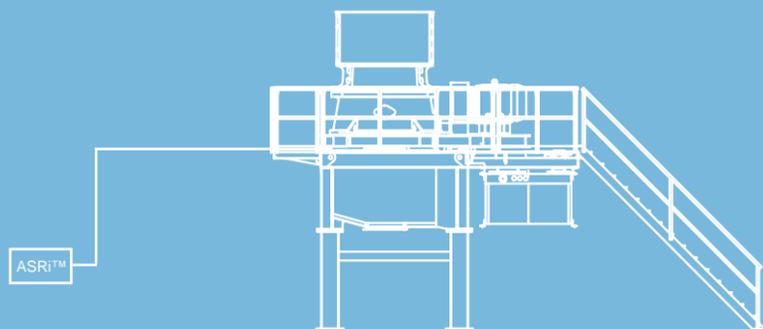
ASRi's calibration function is considerably simpler than that of previous models. When the system is first put into operation, the user is presented with a step-by-step guide to the setting-up procedure. Normal calibration of the crusher has been developed further and a "metal-to-metal" calibration now requires just a single press of a button.

An IWC™ (Intelligent Wear Compensation) in ASRi is an improved automatic feature, which means you do not need to calibrate as frequently.

The system automatically switches from the "metal-to-metal" calibration method to "calibration with lead" when this is necessary.

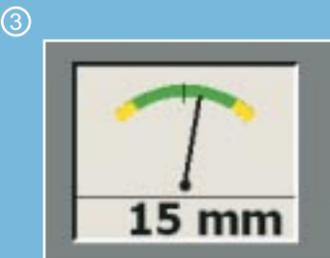
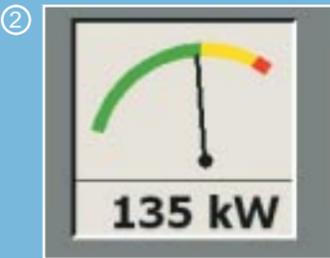


WHICH CRUSHERS CAN BE AUTOMATED?
The basic requirement for using an automatic regulator such as the ASRi system is that the crusher has an hydraulic adjustment setting that allows for repeated, rapid setting adjustment during operation with the crusher under full load. All Hydrocone crushers are therefore ideal for use with ASRi.



all the information you need at **YOUR FINGERTIPS**

ASRi has a simple touch screen interface, which will present you with as much or as little information as you choose. As well as the top-level readings always shown on the normal screen, there are five more main menu items below. You can click on these to get more information on any of the given topics.



- 1 A gauge to show the Hydrosset pressure. (An improved sensor makes it possible to measure the change in pressure, and thus get an instant picture of the crusher's condition).
- 2 A gauge to show the power drawn by the crusher's drive motor.
- 3 A gauge to show the setting governing product size: the CSS (Close Side Setting), as well as the CSS setpoint.
- 4 Box showing what program you are in, and containing the alarm "traffic light".
- 5 Diagram of the crusher, including moving graphic representation of shaft movement. This gives you a precise measurement of where the shaft is (which when converted, gives the setting) and shows when the crusher is full.
- 6 Control to select automatic or manual operating mode. If automatic, the crusher runs in the same pre-configured program that was chosen previously.
- 7 Stop button sends a signal to shut down the feed into the crusher.
- 8 Operating data – shows the crusher's power, pressure, position and temperature in curveforms.
- 9 Set-up – to be used when the machine is first put into operation. You can choose here between the basic and extended functions of ASRi.
- 10 Normal – shows the normal screen picture you see here.
- 11 History – presents information in the same way as operating data above, but gives values over a longer time. You can choose between different time bases, depending on what you want to study.
- 12 Alarm – shows the alarm and the alarm log (see information access, page 4)
- 13 Help – a built-in help function to answer any questions you have whilst using ASRi.

in the words of **OUR CUSTOMERS...**

With over 3000 ASR systems delivered, we have a vast amount of experience in crusher automation systems. This has been very useful during the creation of ASRi, but perhaps even more useful was the feedback and development suggestions we received from ASR users.

DURING RESEARCH for the development of ASRi, it emerged that the two top wishes on the list of requests for improved functionality were a communications interface that is compatible with the plant control system, and a method of knowing what the crusher is actually producing at any given moment. ASRi meets these two key demands. (Read more about how under Easy Communication with other systems and POT page 5)

JOHN WAINWRIGHT & CO LTD, established in 1891, and based in Somerset, produce a high quality "basalt" chipping from there Moons Hill Quarry near Shepton Mallet. Wainwright's Managing Director Mr Peter Barkwill says of the ASR system fitted to their H3800 medium fine chamber Hydrocone.

"As we require all products to be less than 14mm for surface dressing, the ASR maximises the production and quality of these fine fractions while affording the machine protection against feed variations. The system is so highly flexible that production changes can be accommodated at the touch of a button."



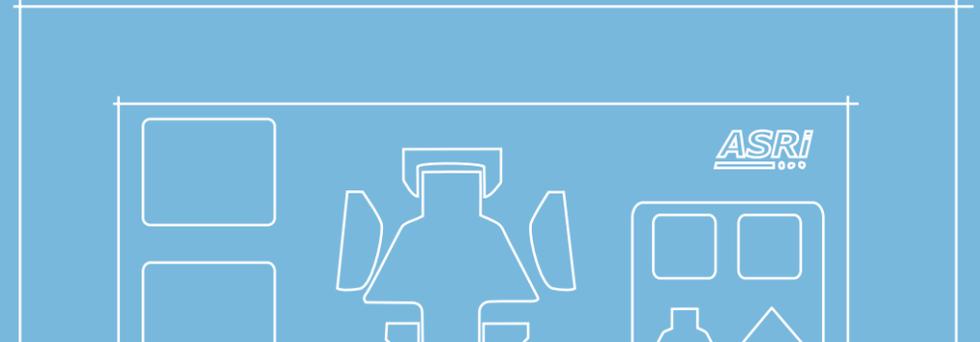
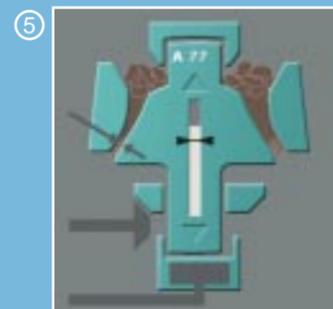
- Mill Superintendent at an Australian gold mine
"The ASR system does all it can to produce as much as possible - exactly what we want".

- Operator at a recycling plant
"The main benefit of the ASR system is the protection it gives to the crusher."

- Manager of a small gravel-crushing plant in Germany
"The ASR system enables us to make more fine material."

- Manager at a large aggregate plant
"The arrival of ASR gave, for the first time, the ability to monitor operating conditions and to maintain a constant CSS".

- At a cement plant we were told that the biggest benefit of the ASR system was that
"It minimizes the need for human intervention".



Sandvik is a high-technology engineering Group with advanced products and a world-leading position within selected niches; tools for metalworking, machinery, tools for rock-excitation, products in stainless steel, special alloys, high-temperature materials and process systems. Sandvik Rock Processing is a business sector within Sandvik Mining and Construction and manufactures products for the mining and construction industry; crushers, screens, feeders, mobile crushers and screening stations. Worldwide business activities are conducted through 300 companies and representation in 130 countries.



Sandvik Rock Processing

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